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Report to the Chairman, Committee on Finance, U.S. Senate

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EMPLOYEE STOCK OWNERSHIP PLANS

Little Evidence of Effects on Corporate Performance

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GAO

United States
General Accounting Office
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Program Evaluation and
Methodology Division

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The Honorable Lloyd Bentsen
Chairman, Committee on Finance
United States Senate

Dear Mr. Chairman:

This report is our fourth and final report responding to a request for information about employee stock ownership plans (ESOPs). In the previous reports, we provided a census of ESOPs, identified factors associated with a firm's decision to establish and continue an ESOP, examined the degree to which ESOPs have broadened the ownership of capital assets in the United States, and estimated the cost of tax incentives for ESOPs in 1977-83.

In the present report, we provide our findings on whether companies with ESOPs experience improvement in productivity or profitability and on certain factors that may influence that experience. In addition, we make an overall assessment of the ESOP program based on our findings in our present and previous reports.

As arranged with your office, unless you publicly announce the report's contents earlier or request earlier release, we plan no further distribution of this report until 30 days after its publication date. At that time, we will send copies of this report to the Senate Committee on Labor and Human Resources, the House Committee on Ways and Means, the House Committee on Education and Labor, and the Joint Committee on Taxation. Copies also will be made available to others who request them.

Sincerely yours,

Eleanor Chelimsky
Director

Executive Summary

Purpose

Do employee stock ownership plans, or ESOPs, improve the economic performance of the firms that sponsor them? Analysts and theoreticians have argued both sides of this question. For those who see ESOPs as a vehicle for improving U.S. productivity, and for those corporations looking for ways to improve their own performance, the answer to this question may be vital.

At the request of the Senate Committee on Finance, GAO is reporting on its work on ESOPs initially requested by former Senator Russell B. Long. In this, the fourth and final report, GAO examines the following issues: (1) Do companies with ESOPs experience an improvement in corporate performance, either in terms of profitability or productivity? (2) What ESOP related factors, if any, are related to changes in performance? The findings on these questions are then incorporated with GAO's previously reported findings on the benefits and costs of ESOPs to provide an overall assessment.

Background

Recognized as qualified employee benefit plans under the Employee Retirement Income Security Act of 1974 (ERISA) and the Tax Reduction Act of 1975, ESOPs carry tax incentives for corporations which sponsor them as employee benefit plans. ESOPs are a form of stock bonus plan designed to make a broad spectrum of employees stockholders in the sponsoring company. Under this plan, the corporation contributes its stock, or assets to buy its stock, into an ESOP trust which maintains tax-deferred individual accounts for participating employees. For its contributions, the firm receives a tax deduction (for ERISA-type ESOPs) or a tax credit (under the 1975 tax act and later legislation but unavailable after December, 1986). Moreover, the corporation may arrange a tax-favored loan through the ESOP. By 1986, U.S. corporations had sponsored about 4,800 ESOPs.

ESOP legislation specifies their purposes as broadening the ownership of stock, providing a means of corporate finance, and transferring stock ownership to employees. For some, these purposes are sufficient reason to justify ESOP tax incentives. Others, however, support ESOPs as a way to increase the economic performance of sponsoring firms. ESOPs could be used to raise funds to finance the capital growth needed for increased productivity. Also, by transferring stock to employees, ESOPs may instill in them an owner's interest in their firm's performance. ESOPs might then, if widely implemented, aid the lagging performance of U.S. corporations.

Results in Brief

GAO's analysis generally fails to substantiate assertions that ESOPs improve profitability and productivity. With regard to several factors that have been suggested as likely to affect ESOP firms' performance, none that GAO examined, except employee participation, showed a statistically significant relationship with changes in either profitability or productivity. Those ESOP firms in which nonmanagerial employees have a role in making corporate decisions through work groups or committees showed more improvement in our measure of productivity than firms without such participation.

Overall, GAO concluded that ESOPs have moved in the direction of meeting their legislative goals of broadening capital ownership and providing an alternative means to finance capital growth. These results have been limited to date. ESOPs also have involved some increase in employee participation in corporate management, but this has not led to control over management by nonmanagerial employees. GAO did not find evidence that ESOPs improve corporate economic performance. Relative to the value of assets in participants' accounts, the cost in terms of forgone tax revenues was relatively high for the period 1977-83. This is largely attributable to the tax credits for some types of ESOPs; these credits have been repealed effective at the end of 1986.

GAO's Analysis

Performance Improvements Associated With Sponsoring an ESOP

GAO's analyses are based on a sample of firms establishing ESOPs during their 1976-79 tax periods and a comparison group of firms without ESOPs. The non-ESOP comparison group and statistical procedures were used to account for economic trends and other factors affecting economic performance independent of ESOP sponsorship.

GAO found that its profitability and productivity measures for firms that adopted ESOPs did not show consistent, statistically significant patterns of improvement after the ESOP was established. However, it is possible that small differences were not detected in the analysis. It should be noted that these results apply only to ESOPs, and do not address performance effects that may be associated with other forms of employee ownership.

Factors Associated With Improved Performance

GAO found that many of the factors related to ESOPs or their sponsoring firms proposed in the literature as likely to affect performance are not related to improved firm performance among this sample of ESOP firms. The firms differed widely on many of the factors we examined; for example, the percent of the company's stock owned by the ESOP ranged up to 58 percent, but averaged only 8.5 percent. The only statistically significant finding was that ESOP firms in which nonmanagerial employees participate in corporate decision making through work groups and committees tended to have had more improvement in the measure of productivity relative to their pre-ESOP period. Because this line of analysis is associational rather than causal, GAO could not determine whether such participation leads to productivity improvement among ESOP firms, or whether otherwise better performing firms tend to give more opportunities for participation to nonmanagerial employees.

Overall Assessment

These findings, when combined with those GAO has reported earlier, provide the basis for making an overall assessment of ESOPs. GAO concluded that ESOPs have broadened stock ownership among plan participants, but that the effect of ESOPs on the overall distribution of stock ownership has been limited. GAO also found that only 16 percent of ESOPs have used the special leveraging provisions of the tax code to raise funds, and that among these 76 percent used the funds to buy out existing owners rather than to finance the acquisition or repair of physical capital. However, a few firms did use the ESOP leveraging provisions for investment in plant and equipment.

In addition, many ESOP firms reported that employee participation in management decision making increased after the firm established the ESOP, although this generally was by informal rather than formal means and tended to involve traditional areas of employee interest rather than core management functions. GAO concluded that ESOP sponsorship does not imply extensive employee control over management.

The cost of ESOP tax incentives ($12.1 billion to $13.3 billion in forgone taxes over the period 1977-83) has been high relative to the aggregate amount of assets in ESOPs ($18.7 billion by 1983). This is attributable largely to the effects of tax credit ESOPs, which provided less in assets per participant than other types, but at a higher cost in federal tax revenues forgone. The Tax Reform Act of 1986 eliminated the tax credit for this type of ESOP. This likely will reduce the total number of participants and assets in currently active ESOPs substantially, but about 74 percent of ESOPs will not be affected directly. The remaining plans, though

smaller than the tax credit ESOPs, have tended to provide more in assets per participant, and to cost less in tax revenues forgone.

Recommendations

GAO is making no recommendations as a result of this study because provisions of the Deficit Reduction Act of 1984 and the Tax Reform Act of 1986 have addressed some of the concerns raised in GAO's December 1986 report and it is too early to evaluate the effects of these legislated changes.

Agency Comments

As a result of discussions with the staff of the Senate Finance Committee, GAO did not obtain agency comments on this report.

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Abbreviations

ANCOVA	Analysis of covariance
DEFRA	Deficit Reduction Act (1984)
ERISA	Employee Retirement Income Security Act (1974)
ESOP	Employee Stock Ownership Plan
GAO	U.S. General Accounting Office
IRS	Internal Revenue Service
JCT	Joint Committee on Taxation
MANOVA	Multivariate analysis of variance
PAYSOP	Payroll-based tax credit ESOP
SOI	Statistics of Income Division, Internal Revenue Service
TRASOP	Tax Reduction Act ESOP

Introduction

Employee stock ownership plans (ESOPs) are employee benefit plans recognized in provisions of the internal revenue code and related legislation. They are designed to make employees stockholders in the firms that employ them. Various tax benefits that may promote ESOPs are available to sponsoring corporations and participating employees.

The major and explicit goals of ESOP legislation are to broaden the ownership of stock and provide a mechanism for corporate finance (through the leveraging provisions). In our December 1986 report, we stated that the distribution of stock ownership appears to be broader within ESOP firms than in the population at large but that the effect of ESOPs on the overall distribution of stock ownership is limited because these plans are relatively few, they cover a small percentage of the work force, and they control a small percentage of all stock (U.S. General Accounting Office, December 29, 1986). We also reported that only about 16 percent of all ESOPs active in 1983 have used the leveraging provisions of the ESOP legislation, and that among these plans most (76 percent) used at least some of the funds borrowed to purchase outstanding shares from other stockholders.

Some analysts and theoreticians have argued that in addition to broadening the ownership of capital, ESOPs could help improve the economic performance of sponsoring firms. In particular, they have suggested that firms sponsoring ESOPs should realize improvements in profitability and productivity, compared to their performance without ESOPs. At the request of the Senate Committee on Finance, we address in this report the extent to which firms that sponsor an ESOP improve their economic performance, and the factors associated with improvement. This is our fourth and final report on work we have done in response to a 1984 request by former Senator Russell B. Long. We also use our previously reported findings on benefits and costs of ESOPs to provide an overall assessment of ESOPs.

Definition of ESOP

Employee stock ownership plans are recognized as benefits employers provide employees under the Employee Retirement Income Security Act (ERISA) of 1974, the Tax Reduction Act of 1975, and later legislation. Specifically, they are defined as stock bonus or combined stock bonus and money purchase plan trusts (or, in some cases, as parts of profit-sharing plans). Employers contribute cash or other assets (generally company stock) to a plan trust, which generally allocates these contributions to the accounts of individual participating employees. Employees receive partial or full distributions of the assets from their accounts

when they retire or leave the firm or when other events occur, as specified in the plan. Unlike most other types of plans, ESOPs must be invested primarily in the securities of the sponsoring employer rather than in a diversified portfolio.

The Congress legislated a number of tax incentives to encourage the establishment of ESOPs. Employers and employees (and in some cases other individuals or entities) may take advantage of these incentives, provided the plan to which contributions are made is "qualified" for special tax treatment by meeting numerous requirements of the internal revenue code. Employers who do take advantage of these incentives may generally deduct contributions for income tax purposes (or, under other provisions now repealed, take a tax credit for such contributions), and employees may defer taxes on those contributions until they receive a distribution from the plan.

The tax-related legislation providing these incentives results in two broad ESOP categories, depending on whether they were allowed tax deductions or tax credits. The first grows out of ERISA, so we refer to ESOPs of this type as "ERISA-type ESOPs." Under the terms of ERISA, ESOPs are permitted to borrow funds to purchase employers' securities. If a plan takes advantage of this provision, then the employer makes contributions to the trust sufficient to meet annual principal and interest payments on the loan. Generally, these contributions are fully deductible from income for tax purposes. In effect, the employer may use this procedure to borrow from a financial institution, repaying the loan with pretax dollars by deducting both principal and interest payments. Ordinarily, only interest payments would be tax deductible.

While ESOPs may take advantage of this provision, they are not required to do so. Those that do are called "leveraged ESOPs." Other plans that provide for such leveraging but have not actually borrowed funds are called "leverageable ESOPs," and those that do not include leveraging provisions are referred to as "nonleveraged ESOPs." Contributions to all ERISA-type ESOPs are eligible for tax deductions but not tax credits for sponsoring firms.

The second broad category of ESOPs, tax credit ESOPs, was established under the Tax Reduction Act of 1975. This act permitted a firm to take a tax credit equal to 1 percent of qualified investment in plant and equipment, provided it made a contribution to an ESOP of an equal amount. (This credit was in addition to the 10-percent investment credit ordinarily allowed.) These plans became known as Tax Reduction Act ESOPs or

TRASOPS. All of the tax credit ESOPs discussed in this report are TRASOPS. Beginning in 1976, an additional 0.5 percent credit was permitted to firms that contributed a like amount to match employee contributions to an ESOP. In 1983, the basis for the credit was changed from investment to 0.5 percent of covered payroll, and these plans became known as "payroll-based ESOPs," or "PAYSOPS." The legislation providing for tax credits for ESOPs was repealed effective December 31, 1986, by the Tax Reform Act of 1986.

ESOPs and Economic Performance

Some proponents have reasoned that ESOPs improve the economic performance of sponsoring firms. Two main arguments support this view. One is that leveraged ESOPs can be used to finance capital expansion, which can lead to improvements in productivity.

The second argument, relying on the psychology and economics of ownership, suggests that ESOPs can have positive effects on corporate performance. Since ESOPs make workers stockholders in the firms that employ them, they give workers an owner's stake in the success of their firms. This could be a powerful motivation for workers to take or support actions that improve productivity and profitability. For example, workers might tap their experience to make management aware of changes in processes that might improve productivity, and they might not resist capital modernization or work procedure changes proposed by management that promise performance improvements.

Evidence shows that many firms have established ESOPs for performance related reasons. In our December 1986 report, we provided the results of our survey of a representative sample of ESOPs that addressed this issue, among others. Seventy percent of our respondents indicated that they had established an ESOP to help improve productivity; 24 percent reported they had done so to raise capital for investment. From their experience, 36 percent reported higher productivity and 23 percent reported improved profitability.

Nevertheless, some analysts have questioned the degree to which ESOPs can be expected to motivate workers. They argue that ESOPs are weak vehicles of direct employee ownership and, therefore, productivity gains. According to this line of reasoning, employees do not actually receive an employer's securities until separation from service; they receive passed-through dividends, if any, only on the portion of the securities in the trust which have been allocated to their accounts; and they gain voting rights only on special occasions and, again, only for

securities allocated to their accounts. For example, the President's 1985 tax reform proposals contained the following comments:

"To the extent the full benefits of owning employer securities are deferred for ESOP participants, the intended incentive for employee ownership is diminished. Indeed, if participation in the ESOP is in lieu of current compensation, such deferral may actually lessen employees' overall incentive to increase productivity." (U.S. President, May 1985, p. 315)

In short, ownership through ESOPs may be too limited and too delayed to have a motivating effect on employees.

Moreover, ESOPs may not contribute greatly to capital expansion or improvement leading to productivity gains. ESOPs are not required to use the leveraging provisions to raise funds or to use such funds to finance new or improved physical capital. Indeed, as we reported in December 1986, very few ESOPs have used the advantages of leveraging to raise funds for investing in new plant or equipment or to modernize existing plant and equipment (U.S. General Accounting Office, December 29, 1986). This means that, in practice, ESOPs could have lead to higher productivity through improved physical capital in only a few cases. (See appendix I for a review of studies on the relationship of ESOPs to corporate economic performance.)

The interest in ESOPs as potential motivators of improved economic performance reflects concerns about recent trends in productivity in the United States. As we reported in February 1986, the rate of U.S. productivity growth has slowed since 1965 and was slight between 1977 and 1982. Concern about this slowdown is reflected in statements such as the following:

"The relationship between changes in productivity and improvements in the standard of living suggests why an apparent slowdown in productivity growth, such as that experienced in the United States in the past decade, is a cause for concern. It implies a slower improvement in our ability to raise levels of consumption, to reduce poverty, and to enhance the quality of life." (National Research Council, 1979, p. 25)

During this period, other industrial countries have had higher rates of productivity growth, reducing the U.S. edge in this area. Differences in relative productivity rates may help explain trade imbalances between nations. Thus, if ESOPs help improve productivity in U.S. firms, widespread sponsorship of ESOPs might reduce an area of possible vulnerability in the U.S. economy.

Objectives, Scope, and Methodology

The major objective of this study was to measure the relationship between the presence of an ESOP in a firm and the profitability and productivity of that firm. Related to this was our objective of examining factors that may be associated with improvement in profitability or productivity among ESOP firms.

To address our objectives, we examined a sample of corporations that established ESOPs from 1976 through 1979. We designed our study to compare the performance of ESOP firms in the years immediately before they established their ESOPs to the years immediately after. We sought data for the 2 years before an ESOP was formed, the year it was formed, and the 3 years following its formation—a total of 6 years.

One problem with comparing performance before and after the formation of an ESOP is that change might reflect factors not at all associated with its formation. For example, an increase in productivity after plan formation might be attributable to the ESOP, but might also reflect general economic trends, random variation, or other factors. To determine whether something other than ESOPs accounted for observed changes in a firm's performance, we selected a sample of firms without ESOPs to represent the trends in profitability and productivity for similar firms over the years we studied. We made this non-ESOP comparison group as similar to the ESOP sample as possible by matching the two sets of firms by industry and size.

The financial data we used for measuring profitability and productivity in both the ESOP and non-ESOP samples came from corporate income tax returns, copies of which the Internal Revenue Service (IRS) supplied us. We collected data on each firm for a 6 year period. The precise years depended on the year of formation of the ESOP for each pair of firms (one with an ESOP and a matching firm without), the earliest data coming from 1974 (for ESOPs formed in 1976) and the latest from 1982 (for ESOPs established in 1979). Additional data came from two surveys of the ESOP sample we conducted in 1985 and from computer data on employee plans that IRS provided us.

Some of the data we used in our analysis come from our survey of a sample of about 2,000 plans IRS identified as having "ESOP features". From the responses of 81 percent of the plans sampled, we identified about 1,100 as ESOPs, and we conducted a detailed follow-up survey about them and the sponsoring corporations. The response rate for the second survey was 77 percent. We used the data from these surveys to construct measures of a number of variables in our analysis such as the

percentage of the company owned by the ESOP and the degree of employee participation in corporate decision making.

From the approximately 1,100 ESOP firms, we identified 414 companies that established their ESOPs during their tax-reporting periods 1976 through 1979. We excluded from this group any firm that (1) was not active throughout the required 6 year period, (2) did not file tax returns for each of the 6 years, or (3) had unrecoverable tax returns for itself or its matched non-ESOP firm. The resulting subsample of 111 firms approximates the distribution of all ESOPs on such dimensions as industry, type of ownership, and type of ESOP. (See appendix II.)

Based on discussions with the staff of the Senate Finance Committee, GAO did not obtain agency comments on this report.

Chapter 2

ESOPs and Corporate Performance

We were asked to examine whether firms which adopt an ESOP experience improved performance, specifically in profitability and productivity. Productivity is a major factor influencing profits, but since other factors (such as planning and development, marketing and selling, and financing) also strongly affect profits, profitability trends may diverge from productivity trends. Thus, these measures together give a fuller picture of firm performance than either can do singly.

We compared the performance of a matched sample of ESOP and non-ESOP firms for several years before and after the companies sponsored ESOPs. Drawing from a list of companies that we confirmed in an earlier survey as having adopted ESOPs, we selected those firms that established ESOPs in their tax years of 1976 through 1979. We matched these ESOP firms with non-ESOP firms on two important factors—firm size and industry—that may influence profitability and productivity. To measure performance we collected IRS tax data for these pairs of ESOP and non-ESOP firms for the year an ESOP was sponsored, the prior two years, and the three years following sponsorship. Those matched pairs for which we could collect sufficient data became the sample for our analyses.

Our evidence does not generally show improved corporate performance associated with adopting an ESOP. This chapter presents the analyses underlying that finding. Similar analyses are applied first to profitability and then to productivity. We describe the sample of ESOP firms, the measure of performance, and the performance trends among our samples of ESOP firms and matched non-ESOP firms. Next we apply statistical procedures to estimate the size of the performance change associated with sponsoring an ESOP and to test whether these changes are significant from a statistical point of view.

ESOPs and Corporate Profitability

In this section we analyze the effect of ESOPs on corporate performance as measured by profitability. In our review of other studies which address this question, we found mixed evidence that ESOPs aid profitability. (See appendix I for a review of this literature.) Although our own analysis of profitability also reveals some evidence that some firms experience a transitory profitability improvement associated with ESOPs, we did not find generally confirming evidence for such an improvement.

Measure of Profitability

Although profitability can be measured in a number of ways, our access to financial data from corporate tax returns allowed us to measure profitability as after-tax return on assets. After-tax return on assets reflects

the efficiency with which a corporation uses its assets. In order to ensure a fairer comparison between firms that raise funds in different ways, we adjusted the measure to compensate for the different tax effects on profits from raising corporate funds through loans or stock offerings. (See appendix II for a detailed discussion of our measure of profitability.)

Characteristics of the ESOP Sample

In general, our ESOP firms are well matched with the non-ESOP firms and are fairly representative of all ESOPs. The non-ESOP firms were precisely matched to the ESOP companies on the 4-digit Principal Business Activity Code used by the IRS and are well matched with the size of ESOP firms as measured by gross receipts. Moreover, the ESOP firms are fairly representative of all ESOPs. They have generally the same rank distribution by industry, although they somewhat underrepresent the proportion of both ERISA-type ESOPs and privately held firms. (See appendix II for details about the matching and sample.)

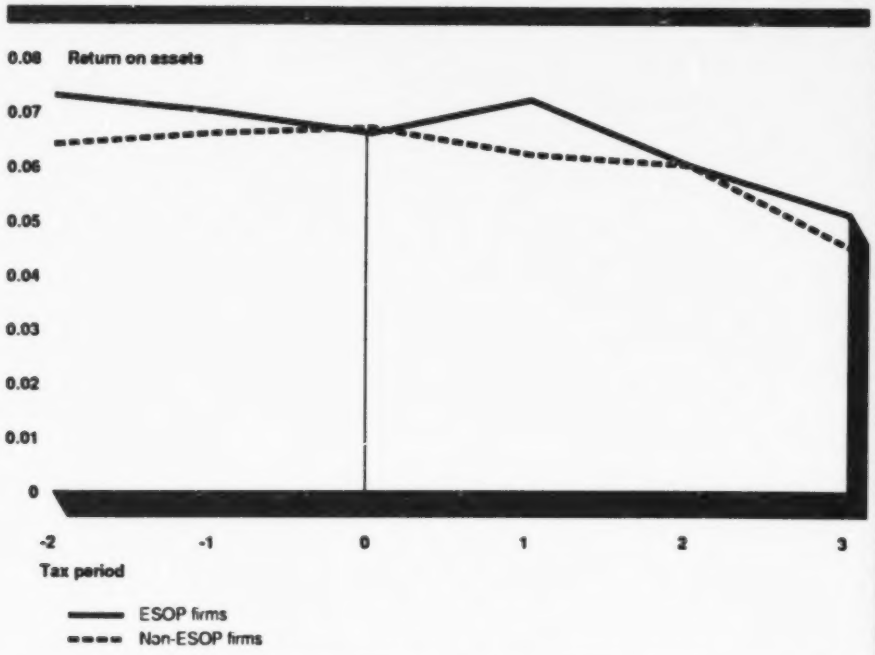
Description of the Profitability Trends

Profitability trends for the median ESOP firms and non-ESOP firms, as shown in figure 2.1, allow a preliminary analysis of whether ESOPs improve performance. (A median represents the typical case as defined, for instance, by the value at which 50 percent of the ESOP firms have lower profitability scores and 50 percent have higher profitability scores.) Conceptually, in the simplest case, if ESOPs were associated with improved profitability, ESOP firms' profitability would increase compared to the non-ESOP firms' during the three years after sponsoring an ESOP. On the other hand, if the profit rates for ESOP and non-ESOP firms were changing at approximately the same rate, these changes would be largely attributable to factors common to both types of firms rather than to sponsorship of ESOPs.

Note that throughout this report, the number of matched pairs analyzed is dependent upon missing data and the number of data points required for a particular analysis. For this description of profitability trends, for example, we include only pairs for which we had the data to calculate profitability across all 6 tax periods. Other analyses and our productivity measure may have different data requirements, resulting in a different number of usable pairs of firms.

Although the ESOP firms show a rise in profitability in the first year after sponsoring an ESOP, figure 2.1 does not convincingly link ESOPs and

Figure 2.1: Median Profitability Before and After Sponsoring an ESOP



[a]The central vertical at 0 represents the tax period when an ESOP was adopted. N=102 pairs of ESOP and non-ESOP firms.

improved profitability. The ESOP firms do not clearly become more profitable than similar firms lacking an ESOP. Moreover, we need statistical tests to determine whether the differences in economic performance between the ESOP and non-ESOP firms are statistically significant. A statistically significant difference is not necessarily a large or important one, but it is unlikely to be the result of chance factors affecting our sample of ESOP and non-ESOP firms. A difference in average performances between ESOP and non-ESOP firms is more likely to be statistically significant if it is relatively large compared to the variation in performances for individual firms. Although our plot of median profitability serves as a useful summary of trends, it does not reveal the relative variation of individual firms.

We applied 2 statistical procedures to test in different ways for a statistically significant association between ESOPs and improved corporate performance. The first procedure provides an estimate of the size of profitability change associated with sponsoring an ESOP, whereas the second procedure tests for several possible trend patterns indicative of

profitability improvement that might differentiate ESOP from non-ESOP firms. (See appendix III for a fuller discussion of the procedures.)

Estimate of Profitability Associated With ESOPs

We applied a statistical procedure to estimate the change in profitability associated with sponsoring an ESOP and to test whether this change is likely a chance occurrence due to the make-up of our sample of firms. This procedure, analysis of covariance (ANCOVA), statistically equalizes the profitability of the ESOP and non-ESOP firms in the pre-ESOP period, and then estimates how different the predicted profit rates for the ESOP and non-ESOP firms would be after ESOP sponsorship.

Table 2.1 presents the estimates of the effect of ESOPs on firms' profitability for the first, second, and third years after a firm had sponsored one. In addition, we present separate estimates of the profitability change associated with sponsoring an ESOP for firms adopting ESOPs in 1976-77 and 1978-79. This breakdown is used because the impact of the ESOP may vary with the business cycle. Ideally we would present separate analyses for each of the four years of ESOP formation, but there were insufficient numbers of cases in some years to permit this further breakdown.

Table 2.1: Estimates of ESOP Effect on ESOP Firms' Profitability

Firms with ESOPs	Year after sponsoring	Percent change	95% confidence interval	Significance	N of pairs
ESOPs formed in 1976-1977	First	−2.0%	±4.2%	NS[a]	63
	Second	2.7%	±2.6%	S[b]	63
	Third	3.4%	±5.2%	NS	63
ESOPs formed in 1978-1979	First	−1.1%	±4.6%	NS	43
	Second	−3.4%	±6.1%	NS	43
	Third	−3.7%	±8.2%	NS	43

[a]Not significant at the 0.05 level of significance.

[b]Significant at the 0.05 level of significance.

Each estimate has a confidence interval that indicates the range within which we estimate we can be 95 percent confident that the ESOP effect lies. If a confidence interval includes the value of 0.0 percent, we cannot be certain that the ESOP has any effect at all. The statistical "significance" column in the table summarizes our confidence that our estimate excludes the possibility of no ESOP effect.

Our ANCOVA analyses generally do not confirm profitability improvements. Only the estimate for firms sponsoring ESOPs in 1976-77, indicating a 2.7 percent profitability improvement during the second year, is statistically significant. This improvement appears transitory; the estimate for the third year is not statistically significant. However, the firms sponsoring ESOPs in 1978-79 do not show even a transitory increase in profitability.

The transitory second year improvement for firms sponsoring 1976-77 ESOPs could occur for several reasons. Perhaps workers are initially enthusiastic but their enthusiasm subsequently cools, leaving no performance effect by the third year. The fact that the improvement only occurs in the corporations forming ESOPs during the earlier years suggests that perhaps different types of firms or ESOPs are represented than those sponsoring ESOPs later. The transitory improvement, however, is not the result of the lesser performance of one type of ESOP obscuring the better performance of the other type. When tax credit and ERISA ESOPs were tested separately, neither was statistically significantly related to profitability improvements for any of the three years after sponsoring an ESOP. Alternatively, positive ESOP effects may only occur during better business conditions, and perhaps worsening business conditions at the end of this period may block possible improvement. Finally, although our estimate was statistically significant, the closeness of its confidence interval to zero leaves the possibility that it is a chance finding.

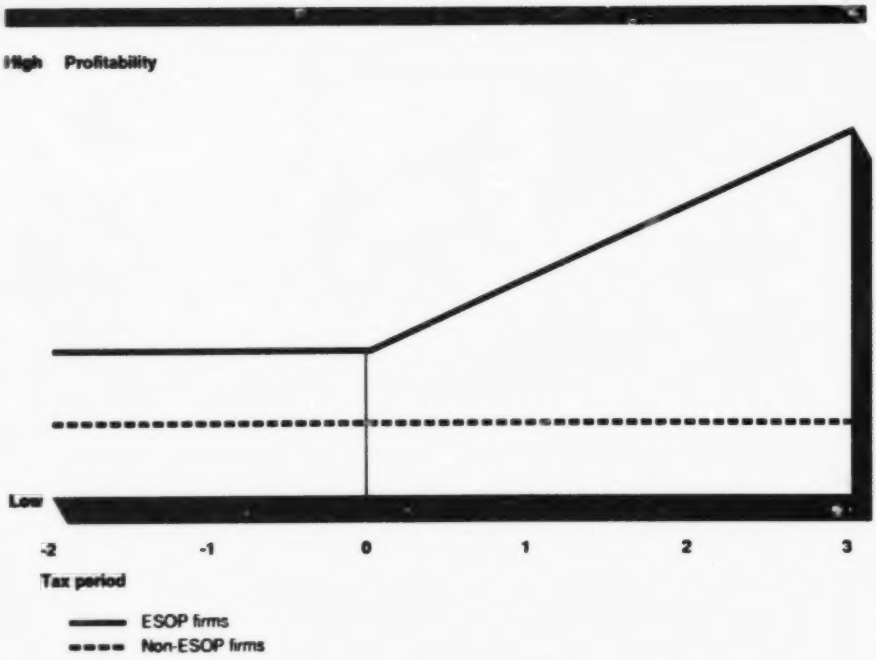
Test for Patterns of Profitability Improvement

In a second line of analysis, multivariate analysis of variance (MANOVA), we employed a different strategy for identifying a profitability improvement among the ESOP firms. We used ANCOVA to statistically equalize the pre-ESOP profitability of the samples of ESOP and non-ESOP firms to estimate the size of the ESOP effect year by year. MANOVA's strength is an ability to test for differential trends between the matched pairs of ESOP and non-ESOP firms. If these two lines of analysis that employ different statistical strategies reach congruent findings, our confidence in our findings will be strengthened.

Using MANOVA we tested for three patterns that would reasonably indicate profitability improvement related to ESOPs. (See figures 2.2 through 2.4 for illustrations of these patterns.) One reasonable pattern would show ESOP firms' profitability begin to grow faster than matched non-ESOP firms after adopting the ESOPs. A second pattern would show ESOP firms jumping to a clearly higher profitability level relative to the non-

ESOP firms after sponsoring an ESOP. A third pattern is identical to the second, except the jump occurs after a lag, in the second year after sponsoring an ESOP.

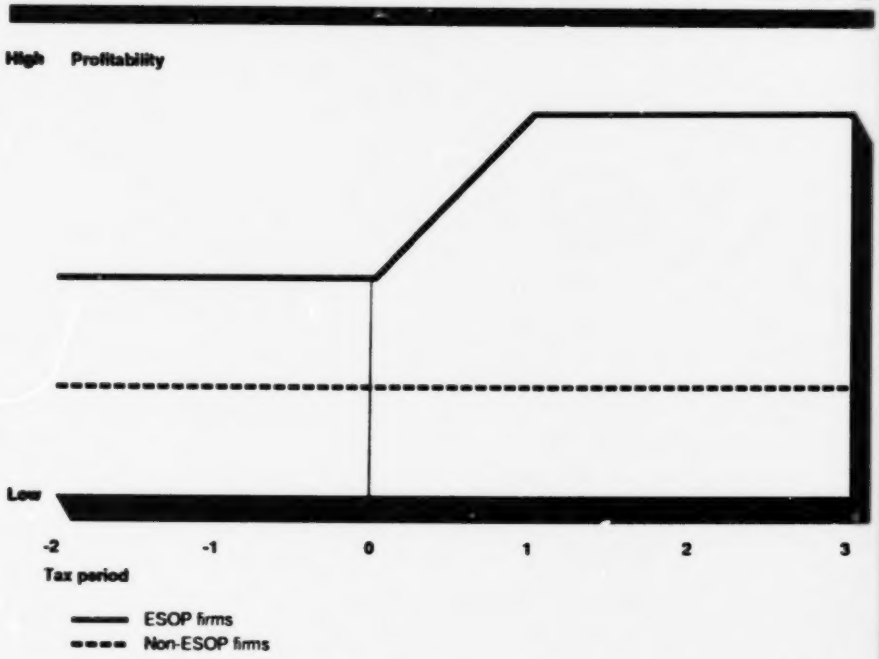
Figure 2.2: Hypothetical Change in Rate of Growth After Sponsoring an ESOP



[a]The central vertical at 0 represents the tax period when an ESOP was adopted.

As with our ANCOVA analysis, we could not substantiate a profitability trend associated with sponsoring an ESOP. Table 2.2 shows that none of the patterns reasonably associated with profitability improvement were statistically significant. (To be considered statistically significant, a finding must have a conservative probability—5.0 percent or less by convention—of incorrectly rejecting a conclusion of no ESOP effect.) In other words, none of these patterns consistently differentiated the profitability trends between the matched ESOP and non-ESOP firms better than might be expected by chance. Moreover, considering the type of ESOP (tax credit or ERISA type) and the year of ESOP formation also failed to reveal statistically significant patterns of improvement.

Figure 2.3: Hypothetical Jump in Profitability After Sponsoring an ESOP



[a] The central vertical at 0 represents the tax period when an ESOP was adopted.

Table 2.2: Testing for Different Profitability Patterns Between ESOP and Non-ESOP Firms Associated With Sponsoring an ESOP[a]

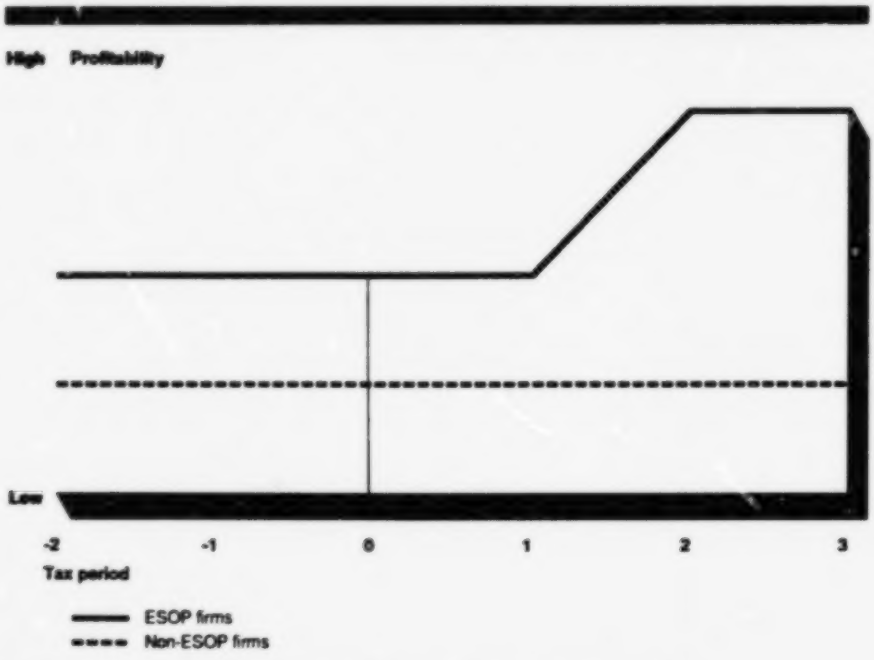
Difference in pattern of change	F test	Significance
Rate of growth after Sponsoring	0.13	0.72 (NS[b])
Jump in Level After Sponsoring	0.28	0.60 (NS)
Jump in Level After 1st Year	0.00	0.99 (NS)

[a] N = 102 pairs of firms.

[b] Not significant at the 0.05 level of significance.

Neither statistical procedure, then, confirms persisting improvements in profitability. The differing procedures of testing probably account for the apparent inconsistency of a single statistically significant finding from the ANCOVA analysis but no statistically significant findings from the MANOVA. Each ANCOVA estimate is based on only two periods (the year before sponsoring the ESOP and the relevant year after sponsoring an ESOP), but MANOVA tests the whole pattern over all six periods.

Figure 2.4: Hypothetical Jump in Profitability Lagging One Year After Sponsoring an ESOP



[a] The central vertical at 0 represents the tax period when an ESOP was adopted.

ESOPs and Corporate Productivity

The second aspect of corporate performance we examined was productivity. As is the case with profitability, prior studies have provided mixed evidence about whether ESOPs are associated with productivity improvements. Our evidence does not confirm a statistically significant relationship between ESOPs and improved productivity.

Measure of Labor Productivity

We have defined productivity as labor productivity, measured as the ratio of real value-added to real labor compensation. Productivity measures in general indicate the efficiency with which production inputs are used to create production outputs. Any measure of labor productivity expresses this relationship as one between some measure of output, such as the dollar value of output or the number of units produced, and some measure of labor input, such as hours paid or number of employees. From the financial data on corporate tax returns, we constructed a

measure of labor productivity. We measured output as a form of value-added (the value of output after adjusting for inventories and costs of materials), and labor input as total labor compensation (salaries, wages, and benefits). Since we have deflated both labor compensation and value-added by industry specific deflators, our measure is the ratio of real value-added to real unit of labor input.

Our measure of productivity has potential strengths and shortcomings. To the extent industry specific deflators do not reflect the firm specific experiences of the corporations in our sample, bias is introduced into our measure. (We have averaged productivity in the before ESOP periods and the after ESOP periods for each firm to reduce this possible distortion.) On the other hand, as a financial measure, our indicator of labor productivity has the potential advantage of adjusting to changes in the quality as well as the quantity of inputs and outputs. (See appendix II for an extended discussion of our productivity measure.)

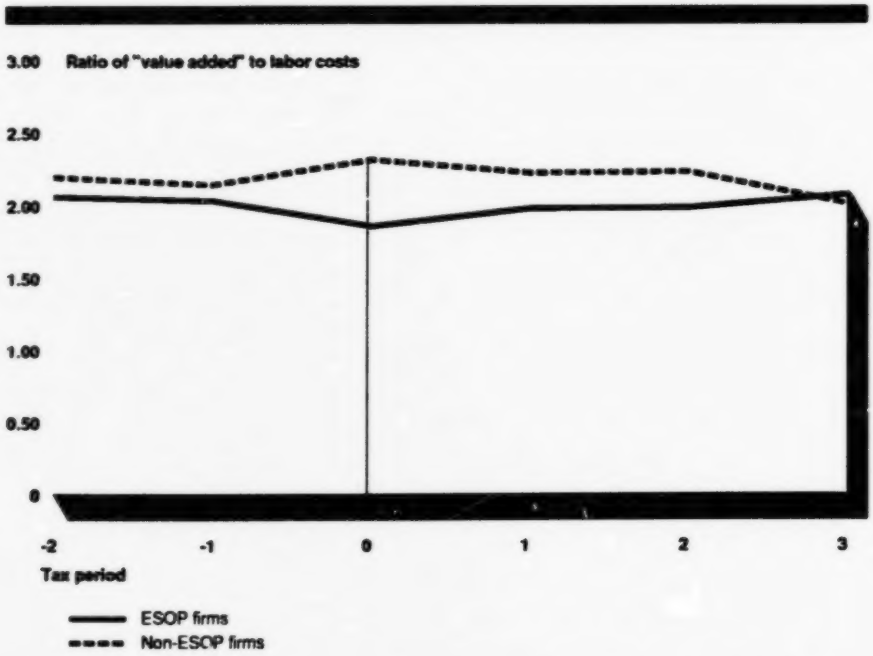
Characteristics of the ESOP Sample

The sample of ESOP firms for the productivity analyses is well matched to the sample of non-ESOP firms and quite representative of ESOPs in the whole population. The proportions of tax credit to ERISA ESOPs is almost identical among our sample and ESOPs in general, but our sample somewhat overrepresents privately held firms by about 7 percent. In addition, the ranking of industrial sectors generally correspond for our sample and ESOPs in general, except our sample does not represent the agricultural sector and provides the mining sector with too high of a ranking. Finally, the sample's proportions of firms sponsoring ESOPs in any year between 1976 and 1979 closely reflects the number of ESOPs that were formed during these years overall. (See appendix II for details of the matching and sample characteristics.)

Description of the Productivity Trends

Figure 2.5 presents the productivity trends for our ESOP and non-ESOP firms. An examination of the trends could suggest a beneficial influence of ESOPs on productivity since the ESOP firms' median productivity appears to improve relative to that of the non-ESOP firms after sponsoring an ESOP. However, as with the profitability trends presented above, inspection of these trends is not an adequate test for an ESOP effect because the variation in individual firms' performances is not taken into account. Moreover, the statistical analysis of our evidence, presented below, does not substantiate a conclusion of a beneficial influence.

Figure 2.5: Median Productivity Before and After Sponsoring an ESOP



[a]The central vertical at 0 represents the tax period when an ESOP was adopted. N=44 pairs of ESOP and non-ESOP firms.

Analysis of Productivity Experience of ESOP Firms

Our analysis of the productivity trends begins with an ANCOVA analysis. Our findings from this analysis are summarized in table 2.3. In contrast to our analysis of profitability, we have a single estimate of the after ESOP productivity because we averaged the three after ESOP years to avoid a biased comparison in our measure. The number of firms analyzed for the productivity analysis is smaller than for the profitability analysis because missing data excludes more cases. Moreover, one pair of firms was excluded because the ESOP firm's extreme values on productivity both before and after sponsoring an ESOP would have had an unreasonable influence on the estimate of the ESOP effect.

Table 2.3: Estimates of ESOP Effect on Productivity

Firms with ESOPs	Percent change	95% confidence interval	Significance	N of pairs
ESOPs formed in 1976-1977	−3.5%	±14.1%	NS[a]	25
ESOPs formed in 1978-1979	−5.4%	±23.8%	NS	20

[a]Not significant at the 0.05 level of significance.

As shown in table 2.3, our evidence does not indicate that ESOP firms become more productive as a result of sponsoring an ESOP. Indeed, we estimate that the ESOP firms performed about 3 to 5 percent less well than if they had not sponsored an ESOP. This productivity difference, however, was not statistically significant. In other words, the productivity differences are not large enough relative to the variation in productivity in our sample of ESOP and non-ESOP firms to reject the possibility that ESOP firms perform about the same as similar non-ESOP firms.

Test for Differential Patterns of Productivity Improvement

In a second line of analysis, using MANOVA, we again could not substantiate a productivity trend associated with sponsoring an ESOP. As we did in our analysis of profitability, we tested whether three patterns between the paired ESOP and non-ESOP firms occurred consistently enough to reject chance variation as an explanation. Different productivity trends between the ESOP and non-ESOP firms on any of the three tested patterns—greater growth rate or a single jump to an improved level with or without a lag of one year—would be evidence of improved performance associated with ESOPs. However, we found none of these patterns of productivity change adequately fit the data in our sample as shown by the statistically nonsignificant results. (See table 2.4.)

Table 2.4: Testing for Different Productivity Trends Between ESOP and Non-ESOP Firms[a]

Differential pattern of change	F test	Significance
Rate of growth after Sponsoring	0.30	0.58 (NS[b])
Jump in Level After Sponsoring	0.64	0.43 (NS)
Jump in Level After 1st Year	0.06	0.81 (NS)

[a]N = 44 pairs of firms.

[b]Not significant at the 0.05 level of significance.

Summary and Conclusions

We found no consistent and statistically significant profitability or productivity improvements associated with sponsoring an ESOP. Our conclusions are based on a methodological design chosen to enhance confidence in our findings. Nevertheless, our finding may still reflect limitations in

our ability to detect statistically significant performance effects. The relatively large confidence intervals around our estimates suggest our sample of firms may have been too small to reliably detect the existence of a small ESOP effect given the wide variability of performance trends for individual firms. Also, despite our efforts to ameliorate any potential distortions, our productivity indicator may still allow a sufficiently biased comparison between ESOP and non-ESOP firms so that the actual ESOP effect is obscured. In addition, it may be that three years is too short a time for any effects of ESOPs to appear, especially given that they generally are structured to provide retirement benefits rather than current income. Finally, we emphasize that these results apply only to ESOPs, and do not reflect the effects of other forms of employee ownership (such as cooperatives or stock purchase plans) on corporate performance.

By applying two lines of analysis to two measures of firm performance, we gain more confidence in the validity of our findings. Analyses from both measures suggest that ESOP firms, on the average, do not consistently perform better than they might be expected to perform had they not adopted an ESOP. This is not to say that ESOP in combination with some other ESOP related factors or under some conditions may not be associated with improved performance. The one statistically significant finding of profitability improvement suggests the possibility of such a contingent effect for ESOPs. In general, the large variation in performance among ESOP firms may represent random fluctuation due to other factors unrelated to ESOPs, or it may reflect the fact that ESOPs are only associated with improved corporate performance under certain conditions. We will examine this latter possibility in the next chapter.

Factors Associated With ESOP Performance

Our analysis also focused on the extent to which any changes in profitability and productivity among sponsoring firms were influenced by ESOP related factors. We found that most of the factors that have been considered as possible influences on changes in performance for ESOP firms are not statistically significantly related to those changes. Only participation in management decision making is positively related to changes in our productivity measure. None of the factors we considered were related to changes in profitability.

Factors That May Be Associated With Performance

In Chapter 2, we reported that overall ESOPs appear to have no effect on the profitability or productivity of sponsoring firms. To test some conditions under which ESOPs may affect performance we conducted analyses that took account of the combined influences of a number of factors associated with the ESOP plans or their corporate sponsors.

Interest in the question of which factors associated with ESOPs or sponsoring firms, if any, may affect performance is reflected in the research literature. (See appendix I.) In general, interest has centered primarily on factors most closely associated with the concept of employee ownership itself. A number of quantitative and qualitative components of ownership have been considered, especially those measuring the degree of firm equity owned by the ESOP, and the extent of employee participation in the plan and in governance of the sponsoring firm. In addition, such contextual variables as the industry and size of the sponsoring firm have been considered.

In conducting our analysis, we have examined a wide variety of factors connected with ESOPs and their sponsoring firms. The data for this analysis came from two of our surveys of ESOP companies, employee plan data provided by the IRS, and corporate tax data.

The factors we considered were selected based on our review of the available literature on ESOP performance and the availability of data. Some of these factors are closely related to the structure of the ESOPs and the extent of employee ownership they provide. Others concern the extent to which employees participate in corporate governance. Still others are contextual in nature, such as the industry of the sponsoring firm.

ESOP Structure and Extent of Employee Ownership

We looked at several variables describing the structure of the ESOP and the extent of employee ownership. The major structural variable is the type of ESOP. Tax credit ESOPs may be very different from ERISA-type ESOPs in terms of their motivational potential. As we have reported previously, compared to ERISA-type ESOPs, tax credit ESOPs tend to be found in larger, more often publicly traded companies; tend to provide relatively little in stock value for each participant; and typically own less of the sponsoring firm's stock (U.S. General Accounting Office, December 29, 1986 and U.S. General Accounting Office, February 7, 1986). They are subject to different rules on voting rights, and are more likely to provide dividend payout than ERISA-type ESOPs. Thus, the structural differences between the two basic types of ESOP may affect the way some of the other factors discussed below relate to changes in performance.

Some analysts believe that the crucial variables for consideration in searching for ESOP effects on corporate performance have to do with the employees' ownership stake in the sponsoring firm. We examined two variables related to this dimension of ESOPs.

First we included the average value of assets per participant in each plan. This is a measure of the individual employee's stake in the success of the firm. It may be hypothesized that the higher the value of the employee's holding in the company, the more the employee is likely to be motivated to improve firm performance. For this analysis, we used the value of assets per participant in 1981, approximately at the end of the period under study. Year-to-year data were not available, making it necessary to use this single point measure.

We also considered a second measure of employees' financial interest in firm performance, pass through of dividends on ESOP stock to employees. Some analysts believe that paying out current dividends to participants provides a tangible reward for improved performance. However, as we reported earlier, only 42 percent of ESOP firms pay dividends, and among them 86 percent retain ESOP participants' dividends in the plan trust (U.S. General Accounting Office, December 29, 1986). Thus, there are not enough cases of firms that pay out current dividends in our sample to merit inclusion of this variable in the analysis.

Ownership and Influence Through ESOPs

Another set of variables analysts have suggested as important for improving corporate performance through ESOPs concerns the extent to which ESOP participants have control over or participate in the management of sponsoring firms. We examined three measures of ownership and participation using data from our survey questionnaires.

First, we considered the degree to which the firm is owned by the ESOP. Each firm was asked to report on the percentage of the company's outstanding shares of stock held by the ESOP trust in 1981. The 1981 data come near the end of the three post-sponsorship years for all of our firms, so that there is at least some reasonable period of ESOP operation reflected in these data. Presumably, the higher the degree of ownership, the greater the stake of the employees in promoting improvements in corporate performance.

Second, we included a direct measure of control related to ownership, whether participants have full rights to direct plan trustees in voting the shares in their individual accounts. Tax credit and leveraged ESOPs in publicly traded firms generally must provide at least some voting rights, but the same requirement does not hold for privately held firms. Moreover, voting rights may be somewhat restricted. Some analysts believe that voting rights may be a key element in motivating employees and promoting improved corporate performance.

Finally, we constructed two measures of the degree of employee influence on corporate decision making. One was based on questionnaire items asking whether nonmanagerial employees, acting through work groups and committees, make decisions on management issues, either on their own or acting with management. The second used a question asking whether nonmanagerial employee participation in company decision making was greater after the ESOP was established than before. Each of these measures was dichotomized for use in the regression models.

Some students of ESOPs contend that participation may be the key variable in determining whether the ESOP leads to any improvement in corporate performance. They argue that, given a role in running their firms, workers will respond by providing critical information on problems in corporate operations, and will cooperate in developing solutions to those problems. This suggests that the higher the level of participation, the greater the improvement.

Others contend that employee participation in management could lead to worse performance. They argue that employees may be motivated by

considerations that threaten the long term health of the enterprise. For example, the recent failure of ESOP-owned Hyatt-Clark involved, in part, a dispute between management and labor over whether to use profits to reinvest in the company or to raise wages.

Contextual Variables

Three major contextual variables were included in our models. One is the industry of the firm, as measured by the IRS Principal Business Activity Code. It may be that the effects of ESOPs on corporate performance differ from industry to industry. We grouped firms in different ways for our analyses (including the nine major industrial categories used by the IRS, and other divisions, such as industrial and non-industrial.) The measure used here is a dummy variable for industrial (manufacturing, and mining and mineral extraction) and non-industrial (all other types of business) firms.

The second contextual variable we included in our models was the size of the firm. It may be that any effects of the other variables on growth in profitability or productivity is affected by the scale of firm operations. By taking account of size we can control for this possibility. Size here is measured as the average revenues for the firm over the three years following formation of the ESOP.

The third contextual variable we examined is the trading status of the firm's stock, public or private. Some analysts have suggested that ESOP effects on performance are more likely in privately held companies because publicly traded firms tend to be larger and to have many non-employee owners. Thus, employees may see publicly traded companies as less susceptible to employee control. On the other hand, publicly traded stock may provide stronger incentives because its value is set in a marketplace, giving employee-owners feedback on the value of their holdings. (Of course, this could have negative effects on motivation and performance if the value of the stock were to decline in the marketplace.)

Analysis of Effects of Factors on Performance

We conducted an analysis of the effects of the factors discussed in the previous section on the performance of sponsoring firms using multiple regression analysis. This is a statistical technique that estimates equations showing the relationship between a dependent variable (in this case our performance measures) and a set of independent variables (here, the variables described in the preceding section). We considered

and evaluated a variety of equations. Here we report on our final analyses.

Performance Measures for the Regression Analysis

In carrying out the regression analysis, we constructed measures of change in profitability and productivity for ESOP firms before and after the sponsorship of the ESOP. First we computed average profitability and productivity scores for each firm for the two years preceding ESOP formation; then we computed average scores on these measures for each firm for the three years after the ESOP was started. Finally, we divided the difference between the post-ESOP average and the pre-ESOP average by the pre-ESOP average. The result was a measure of the proportional change in profitability and productivity for each firm in the sample.

Findings Based on the Analysis

Our findings, presented in table 3.1, are that most of the factors we examined are not associated with improvements in corporate performance. The only statistically significant coefficient is for employee participation in corporate decision making, which is positively related to changes in our measure of productivity. (The trading status of company stock was dropped from the analyses reported in the table because it is highly correlated with other variables in the equations; on separate runs this variable was not statistically significant when related to changes in either profitability or productivity.) Overall, the models do not explain much of the variance in either productivity or profitability changes, as reflected in the R^2values, neither of which is statistically significant.

Each model was estimated using all the cases for which data were available on either the productivity or profitability measure, and on all the independent variables we examined. These numbers differ from those in Chapter 2 because of these differences in data requirements.

The results shown in the table indicate that productivity is positively related to the level of employee participation in corporate decision making through work groups and committees. The regression coefficient can be interpreted as estimating that firms in which nonmanagerial employees participated in company decision making showed an average change in our productivity measure that was about 52 percentage points higher than the change for firms that did not have such employee involvement. (On average, the ESOP firms in this subsample showed an improvement of about 3 percent on the productivity measure.)

Table 3.1: Effects of ESOP Related Factors on Changes in Profitability and Productivity of ESOP Firms

	Profitability		Productivity	
Independent variables	Regression coefficient	Standard error	Regression coefficient	Standard error
(Constant)	.57	1.10	−.40	.25
Type of ESOP	.94	.97	.20	.21
Assets per participant	.00	.00	−.00	.00
Percent owned by ESOP	−.02	.03	−.00	.01
Full voting rights	−.24	.91	.21	.20
Level of participation	−.87	.97	.52[a]	.21
Change in participation	−1.22	.83	.25	.18
Industry	.58	.74	.24	.17
Size (revenues)	−.00	.00	−.00	.00
R^2	.07	3.10	.23	.49
Number of cases	80		47	

[a]Significant at the .02 level.

Of course, our analyses here are associational, not causal. It is not clear whether ESOP firms that give their employees a higher level of participation perform well, or whether such firms that are performing well call upon their employees to participate more in decision making. Either scenario is compatible with our findings, as are other possibilities.

Summary and Conclusions

Our analysis of the relationships between changes in corporate performance before and after establishment of an ESOP and a number of factors that have been proposed as likely contributors to corporate success in ESOP firms has provided only one statistically significant finding. In general, none of the ESOP related factors seem to be related to improved performance, except for participation. We found that the greater the degree of employee participation in corporate decision making, the higher the rate of change in our measure of productivity between the pre-ESOP and post-ESOP periods. No other variable we examined was significantly related to changes in either profitability or our productivity measure.

Overall Assessment of ESOPs

This report, the fourth from our study of ESOPs, addresses the question whether ESOPs promote improved economic performance for sponsoring corporations. Our previous reports have dealt with a variety of other issues concerning ESOPs, including the number of ESOPs, the benefits of ESOPs for employees and employers, and costs to the federal government (in terms of revenues forgone) for ESOP tax incentives. In this chapter we provide an overall assessment of ESOPs based on information we reported in this and the three previous reports.

Benefits of ESOPs

Proponents have cited a number of benefits that could result from adoption of ESOPs. The legislation providing tax incentives for ESOPs explicitly mentions two such benefits as goals for ESOPs: broadening the ownership of capital as represented by shares of stock, and providing a mechanism for raising capital through the leveraged ESOP. In addition, some supporters of the plans have suggested that adoption of an ESOP should improve the economic performance of the sponsoring firm. Others have seen ESOPs as vehicles for expanding employees' influence over the management of the firms that employ them. Neither improved performance nor increased managerial involvement by employees is required by the legislation, however. In this section we review the results of our analyses on the success of ESOPs in all these areas.

Broadening the Ownership of Stock

Stock ownership in the United States is highly concentrated. The University of Michigan Survey Research Center has reported that in 1983 only 19 percent of U.S. families owned stock either directly or through mutual funds (excluding pension fund holdings). For the same year, the wealthiest 1/2 of 1 percent of the population owned 45.6 percent of the value of all corporate stock held directly or through mutual funds, according to a Joint Economic Committee report based on a Federal Reserve Board study.

As we reported in an earlier report, the distribution of stock ownership within ESOPs appears to be broader than is the case in the population at large (U.S. General Accounting Office, December 29, 1986). In contrast to the figures cited above, we found that the median rate of employee participation in stock ownership through ESOPs in sponsoring firms was nearly 71 percent. Assuming that these employees differ widely in income and wealth, then the high proportion of employees participating in stock ownership through ESOPs suggests that these plans do broaden stock ownership within sponsoring firms.

Several factors place an upper bound on the overall effect of ESOPs on the distribution of stock ownership, however. As of 1986 there were only about 4,800 ESOPs. The 7 million workers participating in ESOPs in 1983 accounted for less than 7 percent of the employed labor force, and the $18.7 billion value of ESOP assets that year was less than 1 percent of the $2,151.5 billion in total stock outstanding. The average amount of assets for each participant was about $2,600 in 1983 (about $5,600 in ERISA-type ESOPs).

Providing a Mechanism for Corporate Finance

Congress has provided special tax advantages that permit ESOPs to be used as mechanisms for raising capital. Through a type of arrangement called "leveraging", an ESOP can borrow funds to purchase employer securities on behalf of plan participants. The loan can be paid through employer contributions to the plan over a period of years. The employer can take a tax deduction for the full amount contributed, including the amount used by the plan to pay principal and interest payments on the loan. In effect, the corporation is thereby able to deduct from pre-tax income both principal and interest payments on the ESOP loan. (Ordinarily, only interest payments on loans are tax deductible.) By selling stock from the corporate treasury to the ESOP through this procedure, the corporation could raise funds for capital expansion, provide a benefit to employees (in the form of stock), and save on taxes.

The law does not require that the funds raised through leveraged ESOPs be used to expand capital assets, as described above. The proceeds of ESOP loans can be used for other purposes, such as buying out major shareholders or saving firms that otherwise might go out of business.

In fact, as we reported in our December 1986 report, we found in our survey that few ESOP firms used leveraged transactions to fund capital expansion. Only 16 percent of ESOPs active at the time of our survey ever have used the leveraging provisions. Among these, 76 percent purchased stock from existing shareholders. About 12 percent purchased newly-issued or treasury stock, but in some of these cases the funds raised were not used to purchase new plant and equipment or to repair or improve existing plant and equipment.

In practice, then, most leveraged ESOPs are formed to buy stock from existing shareholders, often allowing major shareholders to convert their holdings into cash for retirement or other purposes. This contributes to the goal of broadening stock ownership by making employees

owners of stock, but does not contribute greatly to the goal of providing an alternative mechanism for financing capital growth.

Improving Corporate Performance

Legislation does not cite improvement in corporate performance as a requirement for ESOPs, but some proponents believe that this benefit should occur in ESOP firms, at least under some conditions. As we have reported in earlier chapters, we find little evidence that the establishment of an ESOP improves such performance, in terms of either profitability or productivity.

Increasing Employee Participation in Management

One of the more controversial goals of some ESOP supporters is increasing the role of nonmanagerial employees in corporate management. Some students of employee ownership believe that increasing employee control over or participation in management could be important in promoting gains in corporate performance by committing employees to the success of the firm. On the other hand, some corporate managers and financial institution decision makers have expressed concerns that workers, if they were able to control management, might opt for short-term wage and benefit gains at the expense of investment in the long-term growth of the company. Moreover, the degree to which employees are interested in control over or participation in the broader concerns of corporate management is unknown; one study of ESOP participants found some interest in such participation among some nonmanagerial employees, but less among others.

As we reported in our December 1986 report, ESOPs generally do not involve employee control over corporate management. There is evidence of some increased nonmanagerial employee participation in corporate decision making in some ESOP firms, but this is largely informal and limited to issues such as safety, working conditions, management-employee relations, and cost reduction. In general, employee participation does not extend to such core management issues as product development, planning, or budgeting and finance.

Summary of ESOP Benefits

Overall, the major benefit provided by ESOPs appears to be a modest broadening of the base of stock ownership. As of 1983, ESOPs held $18.7 billion in stock value. In this regard, a major goal of ESOP tax incentives has been met. We found little evidence that ESOPs provide some of the

other benefits often ascribed to them—capital growth, improved corporate economic performance, or increased employee participation in or control over corporate management.

Costs of ESOP Tax Incentives

To achieve the benefits cited in the previous sections, Congress has enacted a number of tax incentives applicable to ESOPs. These incentives include tax credits (for TRASOPs and successor PAYSOPs), deductions from corporate taxable income (for ERISA-type ESOPs), and deferrals of tax payments (for individual participants). In this section, we review the cost estimates we have previously reported and note some changes in tax law that should affect the costs of ESOPs in the future.

Revenue Loss Estimates

As reported in December 1986, we estimate that during the period 1977-83, the ESOP tax incentives resulted in federal revenue losses of between $12.1 billion and $13.3 billion, an average of $1.7 billion to $1.9 billion per year. Most of these losses can be attributed to the tax credits for TRASOPs and PAYSOPs, which accounted for 89 to 97 percent of the total over the years we studied.

These estimates suggest that the costs of the ESOP program have been high relative to the assets in ESOP accounts. The major benefit, $18.7 billion in stock in the accounts of ESOP participants, amounts to a dollar of federal revenues lost per $1.40 to $1.46 added to participants' accounts as of 1983. This relatively high cost resulted largely from the dollar-for-dollar credits for contributions to tax credit ESOPs. The value of assets in tax credit ESOP trusts as of 1983 was equal to only $1.25 for each dollar of federal tax revenue lost during 1977-83. Depending on the assumptions used in estimating revenue losses for ERISA-type ESOPs, however, $2.56 to $16.99 of assets was added to participants' accounts per dollar of revenue lost.

Recent Changes in Tax Incentives

Congress has made major changes in tax provisions affecting ESOPs during the course of our overall review. Data are not yet available to allow us to review the effects of these changes on the costs (or benefits) of ESOPs, but potentially the changes will be dramatic.

Termination of PAYSOP Credit

The most significant change was the termination of the tax credit for contributions to PAYSOPs included in the 1986 Tax Reform Act. These plans accounted for 90 percent of the participants and 79 percent of the

assets in ESOPs as of 1983, and for 89 to 97 percent of the federal revenue losses associated with these plans. Most of these plans apparently will not be converted to ERISA-type ESOPs; for example, a 1987 Hewitt Associates survey of PAYSOP sponsors found that only 2 percent planned to convert their plans to ERISA-type ESOPs.

The demise of PAYSOPs, while drastically reducing the number of participants and the total value of assets in currently active ESOPs, may prove beneficial for the ESOP movement in general. About three-fourths of ESOPs are of the ERISA type, and therefore are not directly affected by the loss of the PAYSOP credits. In fact, Congress has provided a number of incentives (detailed below) to promote the formation of more ERISA-type ESOPs.

Moreover, PAYSOPs may have weakened overall support for ESOPs because they provided less in benefits to participants than have other types of ESOPs, and at a higher cost in forgone federal tax revenues. As we reported in December 1986, tax credit ESOPs had less in assets per participant in 1983 than did ERISA-type ESOPs. Participants were far less likely to own 25 percent or more of the stock in PAYSOP sponsoring firms than in other types of ESOP companies. While PAYSOP firms were as likely as others to report increased employee involvement in corporate decision making after establishing an ESOP, they were much less likely to report having formalized this involvement through structures such as committees or task forces, and to report that employees actually participated in making decisions (as opposed to suggestions). Finally, fewer firms with PAYSOPs than other types of ESOPs reported raising capital through their plans.

Thus, PAYSOPs provided less in the way of benefits for each participant, but accounted for most of the federal costs of ESOPs. By contrast, ERISA-type ESOPs have provided far more in benefits (such as stock ownership on the part of participants) relative to costs. By ending PAYSOPs and providing stronger incentives for ERISA-type ESOPs, Congress has in effect chosen a smaller but more efficient program for achieving the goal of broadening capital ownership.

Estate Tax Reductions

The Deficit Reduction Act of 1984 (DEFRA) and the Tax Reform Act of 1986 each provided estate tax benefits in return for contributions to ESOPs. DEFRA permitted employers to assume the tax liability of an estate in return for a contribution from that estate to the ESOP of an equal value of the employer's securities. The 1986 legislation was much

broader, allowing an exclusion from an estate's value of an amount equal to 50 percent of the qualified proceeds from the sale of employer stock to an ESOP.

The 1986 provision has been very controversial. Originally, the cost of this incentive was estimated by the Joint Committee on Taxation (JCT) to be about $300 million over 5 years. However, as adopted the language was broad enough to permit more widespread use of this provision, so that the JCT raised this estimate to $20 billion. An IRS ruling that stock used in such a transaction must have been held at the time of death reduced this estimate to $7 billion over 5 years. If passed, pending legislation would further tighten the rules; this is expected to reduce the 5 year cost to the original $300 million estimate.

Other Incentives

DEFRA and the 1986 tax act provided three other major incentives for ESOPs: (1) banks and regulated investment companies may exclude 50 percent of the interest earned on loans to ESOPs from their taxable income; (2) stockholders may defer taxes on capital gains resulting from the sale of stock in a closely held company to an ESOP; and (3) corporations may deduct from corporate income the amount paid in dividends on ESOP stock, provided the dividends are passed through to participants or used to repay an ESOP loan.

The Joint Committee on Taxation staff has estimated that these three provisions, when added to the remaining TRASOP/PAYSOP tax credits carried forward for contributions prior to 1987, will amount to $800 million in 1988, declining to $100 million by 1990 and less than $50 million in 1992. It seems likely, given the sharp drop in these costs by 1990, that they reflect primarily the costs associated with credits carried over from previous years, rather than the new incentives.

Conclusions

Overall, we conclude that ESOPs have provided some benefits, largely in the form of broadened stock ownership among plan participants. In general, they have not been used to promote capital formation, have not improved the productivity or profitability of sponsoring firms, and have not led to a high degree of employee control over or participation in corporate management.

To date, the costs of ESOPs relative to the assets accumulated in participants' accounts have been high, but this can be attributed largely to the effects of tax credit ESOPs. The elimination of this type of ESOP in the

1986 Tax Reform Act should result in a much smaller ESOP program, but one with a better overall ratio of assets to costs. Recent tax incentives may increase the number of ERISA-type ESOPs and the associated revenue losses, but should provide offsetting benefits, at least in terms of broader ownership.

Previous Studies of ESOPs and Corporate Performance

We systematically searched for and reviewed studies that are relevant to testing the theorized relation between ESOPs and the performance of firms. Although accounts of improved performance for specific firms sponsoring ESOPs have appeared in the business press, only a few studies have tested whether ESOPs are in fact linked with improved performance. These previous studies have not generally forged a strong link between the adoption of an ESOP and improved corporate performance.

We present these studies here as the best, though sometimes conflicting, evidence that has been available on this question. Although we do not rank their quality of design and analysis, we note each study has limitations for demonstrating an ESOP effect. However, even studies using the same general type of measure may validly reach apparently contrary findings due to differences in the specific measures, the sample of ESOPs, or other factors. Following our review of the studies individually, we summarize the overall picture that emerges from these studies.

Previous Studies

The earliest major study of the effect of employee ownership on profitability was reported by Conte and Tannenbaum (1978). The authors identified a total of 98 companies that were believed to be at least partially employee-owned, and asked these firms to provide data on their pretax profits and sales in 1976. The ratio of pretax profits to sales for the responding firms (one-third of those sampled) was then compared to the average ratio for their industries. The authors found that the profit ratios in the employee-owned firms that responded averaged 50 percent higher than the average figures for their industries.

In addition to finding employee-owned firms in general to be more profitable than conventional firms, Conte and Tannenbaum also found that the higher the percent of equity owned by workers in a firm, the higher the profits. For other aspects of employee ownership, however, including the percent of employees participating, the right to vote stock, and worker representation on company boards, the authors reported nonsignificant effects on profits.

Several aspects of the study's design limit its usefulness for assessing the effects of ESOPs on corporate performance. Most importantly, the sample of 98 firms included not only 68 ESOPs but 30 firms with other forms of employee ownership. There is also reason to question the appropriateness of the comparison data the authors relied on for non-ESOP firms. Apparently, these data were derived from inspection of an unspecified number of corporate annual reports; thus they deal only

with publicly traded firms, while the employee-owned sample included both public and private firms.

Tannenbaum, Cook, and Lohmann (1984) attempted to overcome some of these limitations by replicating this earlier study with better controls and a larger sample size. To the 98 employee-owned firms that had been surveyed before, this study added 101 additional firms whose names were provided by the National Center for Employee Ownership. For comparison purposes, the authors sampled 154 nonemployee-owned firms from the 1976 Dun and Bradstreet listing, matched to the employee-owned firms by 4-digit SIC code and size. All of these firms were asked to supply profit data for 1977 through 1981. This time, the authors found no difference in profitability between employee-owned and nonemployee-owned firms.

Two articles by Livingston and Henry (1980) and Brooks, Henry and Livingston (1982) also have attempted to shed some light on the relationship between ESOPs and profitability. The authors used data on the annual profits of 51 firms with employee stock ownership and compared them to data from 51 firms without employee ownership and matched to the first group by industry and size. They found the firms with employee stock ownership to be less profitable than firms without these plans.

It is doubtful whether this study can be used to assess the effects on profitability of employee stock ownership plans. Although the authors describe the study as dealing with "ESOPs," what they actually sampled were employee stock purchase plans. These are quite different from ESOPs in a number of ways, as employees participate in them on only an individual and voluntary basis, and stock purchases are paid for largely by the workers themselves. The authors also do not describe adequately how the firms in their sample of employee-owned and nonemployee-owned firms were selected.

A number of qualitative discussions of the effects of ESOPs on productivity have appeared in business periodicals and the popular press, but only a few major quantitative studies of this topic. One study was reported by Marsh and McAllister (1981). This study relied on mail questionnaires with responses from 229 ESOPs.

To measure the relationship between employee ownership and productivity, Marsh and McAllister defined productivity as the ratio between total annual sales and total annual compensation. They computed the

annual average increase in productivity for their ESOP firms between 1975 and 1979, and compared it to unpublished nationwide figures obtained from the Bureau of Labor Statistics. These nationwide figures were a weighted average of figures for each of ten major industry groups, weighted in accordance with the relative representation of each of their major industries within the survey sample. Marsh and McAllister found that productivity in the ESOP firms grew by an average of 0.78 percent per year, while in the weighted national average it declined by 0.74 percent per year. Breaking their sample down by major industry group, they found that ESOPs outperformed the national average in six major industries, equaled it in one, and lagged behind it in three.

Several problems with the Marsh and McAllister survey have to do with the way the ESOP to non-ESOP comparisons were designed. Their universe of ESOPs consists only of firms expressing an interest in ESOPs that were in business in 1975 or 1976, and that were still in business in 1980 and responded to their survey (16 percent of those sampled). The ESOP sample excluded firms that had less than 10 employees. The comparison figures, in contrast, report the performance of all firms in each industry, including firms not in business throughout the 1976-80 period, and those with fewer than 10 employees.

It is also worth questioning whether the authors' procedures for matching by industry went far enough. They took into account only ten "major" industry groups, the first digit of the SIC code. This leaves open the possibility that the firms in their ESOP sample were engaged in quite different activities from the firms to which their performance was being compared.

Finally, there are serious limitations as to what a design of this type can say about the impact of ESOPs on economic performance. Even if they had clearly shown that ESOP firms outperformed an appropriately matched sample of non-ESOP firms, the possibility would remain that the ESOP firms were more prosperous even before their ESOPs were formed. Without data from the period before ESOP formation, Marsh and McAllister could not test this possibility.

While not directly concerned with productivity, a study reported by Rosen and Klein (1983) deserves some attention here. This study dealt only with firms that were majority employee-owned, and it included both ESOP and other kinds of employee-owned firms. They drew their sample from employee-owned companies that came to their attention from a variety of sources. This sample building technique lead to at least

one known sampling bias, an overrepresentation of employee buyouts of failing firms due to media attention to this phenomenon. In most other respects, the design of this study paralleled that of Marsh and McAllister. Again, there was a lack of comparability between the employee-owned sample and the comparison group (employee-owned firms that had gone out of business were deleted from the sample, while comparison figures mixed successful and unsuccessful firms).

Of special interest in Rosen and Klein's study was the dependent variable they chose to examine. Instead of attempting in any way to measure productivity, Rosen and Klein dealt only with employment growth. This allowed them to beg the theoretical and measurement questions involved in dealing directly with productivity, but nevertheless left them with a performance criterion that carries a good deal of practical interest. In their study, Rosen and Klein found that employment grew 2.78 percent faster in their employee-owned firms than it did in conventional firms.

Rosen and Klein also looked at the effects of several ESOP-related factors on employment growth. For example, they divided ESOPs into "democratic" and "nondemocratic" firms, and found that the nondemocratic ESOPs outperformed the more democratically structured firms. They also sorted employee-owned firms into categories based on their reasons for becoming employee-owned. Contrasting distress buyouts to plans based on "philosophical or incentive" considerations, the authors found that firms in the latter category outperformed firms that had become employee-owned through buyouts of otherwise closing firms. Finally, they divided their sample firms into three major industrial categories consisting of "durable goods," "nondurable goods, and "other" and found that employee-owned firms did best in the "durable goods" sector, and worst in their "other" industrial category.

Quarrey (1986) presents evidence that ESOP firms grow faster in employment and sales due to sponsoring an ESOP. His study extends the ESOP subset of Rosen and Klein's sample and, as a consequence, his sample shares the potential biases of theirs. He compares the before and after performance of 45 ESOP firms to a matched sample of 292 non-ESOP firms. The ESOP firms outgrew the non-ESOP firms both before and after sponsoring an ESOP, but by a significantly greater rate after adopting ESOPs. Subtracting the before ESOP advantage from the after ESOP advantage, Quarrey estimates that ESOP corporations improve employee growth by 3.8 percent per year and sales growth by 3.5 percent per year.

Quarrey concluded that employee participation in company decision-making was the most important predictor of company performance. He inspected the correlations between three measures of performance—growth in number of employees, growth in sales, and growth in sales per employee—and several ESOP relevant factors. These factors included management philosophy (belief in employee owners), participation (as perceived by managers and through participation groups), years to full vesting, voting rights on ESOP shares, non-managerial members on the board of directors, and size (number of employees) of the company. As a separate analysis, he examined performance and workers' attitudes and beliefs related to the ESOP: overall satisfaction with the ESOP, amount of influence in the company, amount of additional work effort exerted, and extent of their general role in decision-making. While all these attitudes and beliefs tended to be significantly related to performance, the strongest and most consistent relationship was between performance and workers' perception of their influence in the company due to employee ownership. Quarrey suggests that this latter finding on attitudes confirms the importance of employee participation for corporate performance.

Trachman (1985) compared the growth of sales and employment between high technology companies offering no employee ownership plan and those offering stock options or an ownership plan, which might be an ESOP. Compared to the no ownership firms, the ownership plan firms grew slightly faster in employment, but at about the same rate in sales. However, companies that share ownership with a larger percentage of their employees grow markedly faster than firms having no ownership plans or plans limited to key employees. His conclusions would have been more convincing if he had reported whether the differences were statistically significant.

In a survey of its membership conducted by the ESOP Association in 1982, the association related a number of structural features to managers' perceptions that the ESOP had caused employees' motivation and productivity to improve. The most important influence on these perceptions was found to be the percent of stock owned by the ESOP. Dividend pass through was also found to have a small favorable effect, but voting rights pass through had no effect at all (ESOP Association, 1982). In addition, the association's annual surveys have consistently indicated about 75 percent of the responding companies perceive their ESOP as improving employee productivity (ESOP Association, 1987).

The association's findings on performance are weakened by its sample and its measure. The sample includes only those ESOP firms which are self-selected firstly by association membership and secondly by response to the survey. Such firms may not represent the experience of ESOP firms generally. Moreover, this line of analysis assumes that the respondent can reliably indicate the impact of the ESOP on employee performance, but the respondent may not know for a variety of reasons. For instance, the respondent may not routinely or systematically monitor employees, may not have information about the period prior to the ESOP, and may not be able to isolate the effect of ESOPs from other factors affecting productivity.

In a study limited to ESOPs in a single industry, Hamilton (1983) reported no statistically significant improvement (at the 0.05 level of significance) in productivity for ESOPs over the period of 1978 to 1981. He compared the net sales per employee in a matched sample of 8 ESOP firms and 8 non-ESOP firms in the electrical and electronic machinery, equipment and supplies industry. The average productivity of the non-ESOP firms was higher for all years except 1981, but the productivity of the ESOP firms tended to improve over the years studied, whereas the productivity of the non-ESOP firms remained fairly constant. However, the differences in productivity between the two types of firms were not statistically significant at the 0.05 level (in part owing to the small sample size).

Hamilton also tested four measures of profitability. On three of the profitability ratios (net profits to net sales, to net worth, and to net working capital), the ESOP firms outperformed the non-ESOP firms for the last two years of the period of 1978 through 1981. On a fourth measure of profitability, net sales to tangible net worth, the ESOP firms outperformed the non-ESOP firms for all four years. However, Hamilton concludes that his research does not provide strong support for the superior profitability performance of ESOP firms since, except for the first two years on the single measure of net sales to tangible net worth, the differences between the ESOPs' and the conventional firms' performance were not large enough to be statistically significant at the 0.05 level.

Hamilton's study of ESOP effects must be viewed as exploratory and limited. His small sample of 8 ESOP firms makes the finding of statistically significant results unlikely unless the ESOP effect is large. While his use of multiple measures of performance is laudable, net sales to net worth is not clearly a measure of profitability. Finally, while studying firms in

a single industry strengthens the comparison between ESOP and otherwise similar firms, it limits the generalization of any findings.

Using a relatively large sample of almost exclusively publicly traded firms, Bloom (1985) concluded that no strong evidence exists for a positive productivity effect for ESOPs. Various econometric analyses compared the sales per employee of about 600 ESOP firms and 2600 non-ESOP firms for 1981 and over the period of 1971 to 1981. Although ESOP firms tend to be more productive than non-ESOP firms, when the ESOP firms are more closely matched to non-ESOP firms (for example, statistically matching differences of firm size and capital intensity) the superiority of ESOP firms tended not to be statistically significant. He further suggests that ESOP firms tend to be more productive for reasons other than sponsoring ESOPs, especially since more productive and faster growing firms are more likely to adopt ESOPs.

Bloom further argues that sponsoring an ESOP has no effect on employment. Employment in 1981 grew 80.3 percent faster in his sample of ESOP firms than in his non-ESOP sample. However, when the match between the samples is statistically refined so more similar firms are compared, employment grew 20.4 percent slower among the ESOP firms than among the non-ESOP firms. He attributes both of these findings to the greater likelihood that capital-intensive firms will adopt ESOPs. His various analyses of employment growth over time reveal small (statistically insignificant) differences, some positive and some negative. These findings strongly indicate, Bloom concludes, that ESOPs have no impact on employment growth in publicly traded firms.

Bloom concludes ESOPs have little or no positive effect on profitability among his sample of publicly traded firms. After statistically controlling for differences in profit-relevant factors, three of his estimates of the ESOP effect on profitability are small (2 percent or less), positive, and statistically insignificant. A fourth estimate comparing ESOP and non-ESOP manufacturing firms in 1981 is statistically significant, but indicates a negative effect of 13.0 percent associated with the ESOP. He speculates, however, that this negative estimate is actually an artifact of ESOP firms being more capital intensive on the average, and that it would approximate zero if further and more detailed statistical controls were applied.

Finally, Bloom reports that some of the productivity estimates for ESOP firms are negatively correlated with the fraction of the work force covered by the plan. Moreover, he finds that the productivity of ESOP firms

appears to be fairly randomly related to the ESOP characteristics (percent of company shares held, per capita asset value, and age of the plan) that seemingly provide worker incentives.

The major drawback to Bloom's study for our purposes is the special boundaries to his sample. From our earlier work, we would expect his sample of almost exclusively publicly traded firms to overly represent larger and tax credit ESOP firms (U.S. General Accounting Office, February 7, 1986). However, most ESOP firms are privately held (only 24.5 percent were publicly traded in 1983), and tax credits for ESOPs expired at the end of 1986. Thus, Bloom's findings are limited to publicly traded firms with ESOPs, a minority subpopulation of ESOPs that may shrink even further unless tax credit ESOPs are converted to ERISA-type ESOPs.

The Broader Picture

Review of the prior studies highlights limitations for demonstrating an ESOP effect. The ESOP sample would ideally be randomly drawn to prevent a biased selection. The sample should consist exclusively of ESOP firms so the findings are uniquely attributable to ESOPs. Stock purchase plans or employee ownership through other structures may not affect firm performance in the same manner as an ESOP. In addition, the sample preferably would be drawn from the total universe of ESOPs, making the findings relevant to the spectrum of ESOPs in a variety of settings. To our knowledge, only the present GAO study has drawn a sample exclusively of ESOPs from a random sample of the whole population of ESOPs.

The comparisons made in these studies can also limit the certainty of their findings. The performance of the ESOP firm ideally would be compared both to its pre-plan performance to identify changed performance associated with establishing an ESOP, and to the performance of similar non-ESOP firms to distinguish an apparent ESOP effect from the influence of broader economic conditions. Indeed, as some of these studies have better matched the comparison firms or adjusted for prior performance, evidence of apparent improvements associated with ESOPs has disappeared. Only the studies of Bloom and Quarrey as well as our own study, however, have used these dual comparisons.

Considered together, the above studies do not demonstrate a strong positive effect of ESOPs on firm productivity or profitability. In table I.1, we summarize the results of these studies. Neglecting the strength of their measures, designs, and analyses, an adequate statistical confirmation would show a statistically significant positive finding of improved performance. Such a finding would appear in the table as a pair of "Yes-es"

Table I.1: Prior Studies on ESOPs and Corporate Performance

Study	ESOP sample	Comparison	Measure	Finding: Improve	Finding: Significant
Profitability:					
Conte and Tannenbaum (1978)	Some non-ESOPs	Industry Averages	Pretax Profits to Sales	Yes	No
Tannenbaum, Cook and Lohman (1984)	Some non-ESOPs	Matched Firms	Pretax Profits to Sales	No	No
Livingston & Henry (1980) Brooks, Henry, & Livingston (1982)	Stock Purch. Plans	Matched Firms	Nine Profitability Ratios	Neg Ests[a]	Mixed
Hamilton (1983)	In One Industry	Matched Firms	Net Profits to Net Sales	Some Yrs	No
			Net Profits to Net Worth	Some Yrs	No
			Net Profits to Net Capital	Some Yrs	No
			Net Sales to Net Worth	Yes	Some Yrs
Bloom (1985)	Publicly Traded	Matched Firms	Gross Return on Capital	Mixed Est	Mixed
		Matched Firms and Before and After	Gross Return on Capital	Yes	No
Productivity:					
Marsh and McAllister (1981)	Only ESOPs	Industry Averages	Compensation to Sales	Yes	NR[b]
Hamilton (1983)	In One Industry	Matched Firms	Net Sales per Employee	Yes	No
Bloom (1985)	Publicly Traded	Matched Firms	Sales per Employee	Mixed Est	Mixed
		Marched Firms and Before and After	Sales per Employee	Mixed Est	Mixed
Growth Rates:					
Rosen and Klein (1983)	Some non-ESOPs	Industrial Sector	Employment	Yes	NR
Bloom (1985)	Publicly Traded	Matched Firms	Employment	Neg Ests	Yes
		Matched Firms and Before and After	Employment	No	No
Trachman (1985)	Some in High Technology Firms	High Techn. Firms	Employment Sales	Yes No	NR NR
Quarrey (1986)	Only ESOPs	Matched Firms and Before and After	Employment Sales	No Yes	NR Yes

[a]Negative estimates are only noted if statistically significant.

[b]Not Reported

in the findings column in table I.1. Note that no prior study examining profitability or productivity provides this strong evidence of an ESOP effect.

The picture is less clear for the studies using growth as their indicator of firm performance. Quarrey presents a statistically significant finding of improved employment and sales growth associated with adopting an ESOP. However, using similarly rigorous comparisons but a much larger sample, Bloom reports no significant improvement in employment growth for publicly traded ESOP firms. The best available evidence, then, suggests that ESOPs may be associated with faster growth, but not for employment in publicly traded firms. (We have addressed efficiency measures rather than growth rates in our study.)

Thus, the evidence from prior studies of ESOP effects on corporate performance is inconclusive. Few studies have reported statistically significant positive effects for ESOPs. Most of the studies, whatever their findings, suffer from deficiencies in samples examined, the performance measures used, or the designs employed. Our study addresses these issues through a representative sample of ESOPs, sophisticated measures of performance, and a strong design.

Sample and Measures

In this appendix, we describe and compare the sample of ESOP and non-ESOP firms used in the analyses. We also present a discussion of the indicators we constructed to measure firm performance.

Sample of Firms

Our design requirements to evaluate the impact of ESOPs on the economic performance of sponsoring firms called for two matched samples. We required first a sample of ESOP firms that established ESOPs in a given year to compare their performance before and after sponsoring an ESOP. Second, we needed a comparable set of non-ESOP firms. This second matched sample was necessary to differentiate the effects of business trends from the effects of ESOPs on firms' performance.

The ESOP Sample

For an earlier report, we identified a national sample of approximately 1,100 ESOP firms (U.S. General Accounting Office, September 30, 1985). From this national sample of ESOPs, we selected those 414 firms that established an ESOP in their 1976-79 tax periods. (We used 1979 as the latest year of ESOP formation to ensure that we could examine three years of performance after the ESOP was formed because more recent returns might be unavailable due to IRS processing.) We were able to collect the 6 consecutive tax returns needed for our design for 111 matched pairs of ESOP and non-ESOP firms. Some of these pairs were excluded from our usable samples for particular analyses due to missing data.

As shown in table II.1, the usable samples for our profitability and productivity analyses were fairly representative of ESOPs in general. The productivity sample almost exactly represents the proportion of type of ESOPs in general but somewhat underrepresents publicly traded ESOP firms. The profitability sample maintains the general predominance of privately held and ERISA-type firms, though it underrepresents them by about 12-13 percent. The overall ranks of major industrial sectors for both the performance samples approximate those for all ESOPs, although the proportions are not identical. For instance, the profitability sample somewhat underrepresents agriculture, forestry, and fishing as well as services, while it somewhat overrepresents manufacturing. Given the multiple stages in selecting our sample, we have not made claims about the generality of our estimates; however, our sample of firms fairly represents the range of ESOPs and ESOP firms on several relevant dimensions.

Table II.1: The Distribution of ESOPs by Selected Characteristics in ESOP Firms and Among All ESOPs

	Profitability sample n= 106	Productivity sample n= 45	All ESOPs[a]
Type of ESOP:			
Tax credit	37.7%	24.4	25.8
ERISA	62.3	75.6	74.2
Trading status of stock in active ESOP trusts:			
Privately held	62.9	82.2	75.5
Publicly traded	37.1	17.8	24.5
Major industrial sectors:			
Mining	1.9	4.4	1.5
Agriculture, Forestry, Fishing	.9	0.0	2.7
Construction	5.7	2.2	6.9
Transportation, Utilities	9.4	2.2	7.1
Retail Trade	9.4	11.1	10.9
Finance, Insurance, Real Estate	11.3	15.6	13.2
Services	9.4	13.3	14.1
Wholesale Trade	15.1	17.8	14.6
Manufacturing	36.8	33.3	29.2
Year of formation:			
1976	43.4	33.3	36.3[b]
1977	16.0	22.2	18.8
1978	24.5	22.2	23.0
1979	16.0	22.2	21.9

[a]Estimates are for ESOPs active in 1983.

[b]Estimates are for firms establishing ESOPs in the years 1976-79.

Source: U.S. General Accounting Office, February 7, 1986.

The Matching Non-ESOP Sample

Those firms which adopted ESOPs in their 1976-79 tax periods were matched to non-ESOP firms by industry and firm size. The IRS performed the matching, using a 1977 sample of about 90,600 corporations. After deleting confirmed and suspected ESOP firms from their list, they selected non-ESOP firms matched to our sample of ESOP firms. The match was made precisely on an industry code and then to the closest size, as measured by revenue in the 1977 tax period, the earliest tax year for which data were readily available.

Our match on Principal Business Activity (PBA), which is the Internal Revenue Service's classification of industry, was exact on a four digit code, but may include some underlying error. Two factors are possible

major sources of such error. First, the corporate taxpayer could have entered the wrong PBA code on the tax return. Second, the corporation could have been engaged in multiple lines of activity, so that the code used could be an oversimplification of the business interests represented by the firm.

Each of these potential problems could have resulted in imperfect matches between our ESOP and non-ESOP firms. In the case of miscoding, the problem is obvious. In the other case, the problem is more subtle. Two firms with the same principal lines of business could be engaged in very different subsidiary types of business. If these subsidiary activities constituted a major part of either firm's operations, the apparent closeness of the match on PBA code would be illusory. In either case, the purposes for matching would be defeated in that each firm in the pair would not necessarily be subject to the same economic forces. Thus, the performance of the matching firm would not necessarily provide an adequate baseline against which to measure the performance of the ESOP firm in the pair.

While these problems are potentially serious, we do not believe they are particularly worrisome for this analysis. Classification error is a common problem in studies that must designate elements as similar or different. Moreover, errors in matching would only have a markedly adverse effect on our comparison of matched pairs if the misclassifications were severe. For example, the problem would be more serious if a PBA were incorrect in the first two digits (which identify major industrial categories, such as the manufacture of chemicals and banking) than in the last two digits (which provide more precise information, such as the specific goods manufactured or type of bank). However, we have no reason to believe that the taxpayers covered by our study grossly miscoded the PBAs on the returns we used. Finally, among firms in our sample with the needed 6 tax returns, 63 percent did not file consolidated returns for an affiliated group of corporations. Consolidated returns are probably our best indicator of possible diversification—although the affiliated corporations may be integrated into the same industry—so that the problem of different patterns of diversification does not appear to be a serious one here.

The match on firm size as measured by receipts provided a quite accurate matching. At the median, the non-ESOP firm almost exactly matched the size of the paired ESOP firm (i.e., it had revenues equal to those of the ESOP firm). Moreover, a large percentage of the non-ESOP firms were closely matched to their paired ESOP firms. For instance, 75 percent of

the non-ESOPs in the productivity sample had revenues that were no more than 3.1 percent above nor 5.2 percent below those of their matched ESOP firms.

We are aware that some survival bias may exist in our comparison of ESOP and non-ESOP firms resulting from our sampling procedures. ESOP firms that had not survived to respond to our 1985 survey were not included in our sample. In contrast, the non-ESOP firms remained in our sample if they survived through a tax period during 1979-82, depending upon which was the last tax period we examined. Thus, our sample of ESOP firms may have had a disproportionate share of poorer performing firms screened out, which could potentially lead to overestimating the effects of ESOPs. However, any non-ESOP firm for which we had information that the last examined return was the final return filed for the corporation was dropped from the sample. Moreover, one of our analyses, ANCOVA, statistically matches the performance of the ESOP and non-ESOP samples for the pre-ESOP period, which serves to lessen the impact of any survival bias on our estimate of the ESOP effect.

The size of our usable samples was strongly affected by our requirement for complete data for several years, both for the ESOP and matched non-ESOP firm. We deleted from our analysis any firm that did not file returns for any of the 6 examined years (usually due to starting or terminating a corporation). The sample size was also limited to pairs of ESOP firms and non-ESOP firms for which the IRS provided tax returns for all 6 periods. (For instance, tax returns in audit by the IRS could not always be recovered in time for our data collection schedule.) The effective sample size was further constrained by the adequacy of the data on the tax forms. The necessary data might not be present (items left blank by the taxpayer or attachments or schedules not available to us) or the taxpayer created categories on attachments might not allow us to disaggregate the needed items. A single missing datum needed to measure performance resulted in a pair of ESOP and non-ESOP firms being dropped from the relevant part of the analysis. Thus, the data requirements arising from our chosen design and measures entailed a tradeoff with sample size, but, as discussed above, our ESOP sample remains fairly representative of ESOPs in general.

Measures

In this section we discuss the measures of productivity and profitability used in our analyses.

Profitability

As noted above, since corporate tax returns involve calculating tax on profits, they provide all the information needed to construct a measure of profitability. We measure profitability as return on assets, the ratio of after tax income to total assets.

Our measure takes account of the potentially different capital structures of the firms in our comparison. Interest paid on loans was deductible from pre-tax income during the years studied, but dividends paid to stockholders were not. Thus, the after-tax incomes of two otherwise identical firms would be different if one raised capital by borrowing and the other by selling stock. Even if the interest payments for the first firm were equal to dividend payments for the second, the first firm would have lower after-tax income. Thus, our measure would show the first firm to be less profitable.

To adjust for this difference, we computed each firm's interest tax shield for each year. The interest tax shield equals interest payments multiplied by the firm's marginal tax rate. We subtracted the amount of the tax shield from after-tax income for each firm. By making this adjustment we were able to make fairer comparisons between firms that raise capital differently.

The market value of assets would be the preferred measure of assets for our analysis. However, tax returns provide information only on the historical value of such assets as buildings and other depreciable assets. Recognizing that older fixed capital may be undervalued by using this indicator, we nevertheless concluded it was the best measure available to us.

Productivity

A wide range of options is available for measuring productivity, as productivity is not a unitary concept or measure, but a family of related concepts and measures. The commonality of these concepts and measures is the expression of a relationship between some measure of output, such as dollar value of output or number of units produced, and some measure of input, such as labor, capital, or some combination of the two.

Labor productivity is an appropriate measure for this study because ESOPs are often expected to increase workers' motivation and performance. Yet changes in labor productivity are not necessarily the result of workers' increased or decreased efforts. Productivity is influenced by many factors such as technology, capital investment per worker, level of

output, and managerial ability as well as the skills (quality) and efforts of workers.

Productivity is ideally measured as a ratio between physical input and physical output, such as miles per gallon of gasoline. However, several problems arise in the application of physical productivity measurements. First, physical inputs and outputs are often heterogeneous and simple aggregation of diverse inputs or output units may not be appropriate. Second, physical outputs may not be easily observable or quantifiable.

Because physical productivity measures are often impossible to derive, researchers have developed measures of labor productivity that approximate true productivity measures. A frequently used measure of labor productivity is "value added" (of a firm, industry, or the economy) divided by a measure of labor input. Value added is preferable to the dollar value of output because it excludes the value of materials purchased. The denominator of this measure may be hours worked, or less preferably, hours paid or the number of workers. If data is available, a weighted index of labor hours may be calculated by using wage differentials to account for quality differences between units.

The data available for our study is from tax filings by ESOP and non-ESOP firms. Although tax returns are primarily concerned with corporate profits, they contain the data necessary to calculate a Census "value added" measure of output. Value added as measured by the Census Bureau begins with the value of shipments but excludes costs of materials and adjusts for changes in inventories.

To extract inflationary bias, value added must be adjusted over time by an appropriate price deflator. For a firm level analysis, this adjustment should be made using a firm specific price deflator, but if such a deflator series is not available, an industry price deflator series can be used as a proxy. For our analysis, value added output was deflated by industry specific deflators (implicit price deflators for gross product originating by industry) which the Bureau of Economic Analysis provided. However, deflating firm value added by an industry price deflator series will bias the productivity measure to the extent that price level changes in the firm deviate from industry price level changes.

While the necessary data to calculate firm value added can be obtained from corporate tax records, complete data was not available on hours worked, hours paid or the number of employees. Nevertheless, tax

forms include data on labor input expressed in dollars rather than physical units. These data include wages, salaries, and benefits, which sum to total compensation. This allowed us to measure labor productivity as the ratio of value added output to unit labor input, measured as total compensation (salaries and wages plus employee benefits).

Although this measure has been used by some researchers, it has some shortcomings as compared to the more commonly used measure in which value added is related to physical units of labor. If a firm specific price deflator for labor input is available, our measure is a good approximation of the ratio of value added to a quality-adjusted physical measure of labor input. However, we deflate compensation by industry price deflators. Our deflator is average hourly earnings by industry, provided by the Bureau of Labor Statistics. As with the output inflation adjustment, the use of industry price deflators introduces bias to the extent that price changes in the firm differ from industry price changes.

In the labor market, firm specific price changes may not be closely correlated with industry price level changes due to imperfections in the labor market. For example it has been shown that wage differentials can exist because of geographic immobilities and noncompetitive market structures due, for example, to unionization. Additionally, for our study we establish a dichotomy between firms that have an ESOP and those that do not. This difference concerns an element of employee compensation, and if the existence of an ESOP increases total compensation, our productivity measure may have an inherent bias against ESOP firms.

Our productivity measure rests then on several assumptions. Since our measure of labor input as labor costs can reflect movements in either the price or quantity of labor, we are assuming that changes in price after deflation reflect the quality and quantity of labor input. Second, we are assuming that our industry wide deflators accurately deflate labor costs for the matched firms we are comparing. (Since we are concerned with relative differences in productivity between ESOP and non-ESOP firms, different rates of compensation growth are more of a problem for bias than constant differences in compensation, even over long periods of time.) Third, we assume that sponsoring an ESOP does not change the level or growth of compensation relative to similar non-ESOP firms. For instance, our measure of productivity would be biased against ESOP firms if they raised wages faster than other firms due to their tax advantages.

To lessen the chance of a biased comparison between firms, we adjusted the productivity measure to be less sensitive to different timing of compensation changes. Firms may differ somewhat in the timing of compensation changes, but assuming that compensation rates for firms within an industry tend to equalize over time, the average compensation over several years will show less divergence than the trends for those years. Consequently, we averaged productivity both for the pre-ESOP period and the post-ESOP period.

Although we realize that our productivity measure has some shortcomings, it was the closest approximation to a physical measure of productivity that we could derive given our data constraints.

The Statistical Procedures Used to Estimate the Effects of ESOP

In chapter 2, the effects of an ESOP on a firm's performance were assessed using two statistical procedures. These two statistical procedures were the analysis of covariance (ANCOVA) and multivariate analysis of variance (MANOVA). The present appendix explains the logic behind these two statistical procedures.

First, we must introduce a few labels. A measure that records a firm's performance before an ESOP is introduced is called a "pretreatment" measure. A measure that records a firm's performance after an ESOP is introduced is called a "posttreatment" measure. A firm that sponsors an ESOP is an "ESOP firm." Finally, a firm that does not sponsor an ESOP is a "non-ESOP firm."

Given these preliminaries, it is possible to distinguish two basic methods for estimating the effects of an ESOP (Cook and Campbell, 1979, chs. 4, 5). One method is to compare ESOP to non-ESOP firms using posttreatment measures of performance. This is the approach taken by ANCOVA. The other method is to compare pretreatment measures to posttreatment measures within ESOP and non-ESOP firms. This is the approach taken by MANOVA.

Given the nature of the data that were available for the present study, it was impossible to be sure that either of these two approaches would produce unbiased estimates of the size of the effects of ESOPs at random. That is, we were not able to decide at random whether a firm would sponsor an ESOP. As Cochran and Rubin suggest,

> "If randomization is absent, it is virtually impossible in many practical circumstances to be convinced that the estimates of the effects of treatments are in fact unbiased." (Cochran and Rubin, 1973, p. 417)

Although the absence of random assignment means we cannot be certain that analyses using either of the two approaches produce unbiased estimates of the effects of ESOPs, using both procedures together increases our confidence in the results. This is because each approach is susceptible to different potential biases. To the extent that the joint results from the two approaches agree, the probability decreases that the joint results are severely biased, and conversely the probability increases that the conclusions are correct. This is the reason that both approaches were used in the analyses in chapter 2.

Analysis of Covariance

Analysis of covariance (ANCOVA) estimates the size of the effects of ESOPs by comparing the posttreatment performance of ESOP firms to the posttreatment performance of non-ESOP firms. ANCOVA makes this comparison between ESOP and non-ESOP firms while controlling for differences between the firms in pretreatment performance. Though ANCOVA controls for differences in pretreatment performance statistically, the result is essentially the same as controlling for differences in pretreatment performance by matching (Reichardt, 1979, p.155). (Thus, since we have physically matched ESOP firms with non-ESOP firms on firm size and industry as well as applied ANCOVA in our analysis, we have combined both methods as a means to better control for pretreatment differences.) In essence, ANCOVA compares ESOP and non-ESOP firms on posttreatment performance after matching the firms on a measure of pretreatment performance. The average difference in predicted posttreatment performance between ESOP and non-ESOP firms after they are matched on pretreatment performance is the ANCOVA's estimate of the average effect due to an ESOP.

Why Does ANCOVA Match on Pretreatment Performance?

Theoretically, if firms had been designated at random to establish ESOPs, ESOP and non-ESOP firms would have performed very similarly on posttreatment measures except for differences due to the effect of the ESOPs. That is, if ESOPs had no effect, there would have been no differences between ESOP and non-ESOP firms in their posttreatment level of performance. If ESOPs had a negative effect, ESOP firms would have performed worse than non-ESOP firms on posttreatment measures. If ESOPs had a positive effect, ESOP firms would have performed better than non-ESOP firms on posttreatment measures. In addition, the larger the effect of ESOPs, the larger would have been the difference in performance between ESOP and non-ESOP firms. Therefore, the size of the effect of ESOPs could be estimated by comparing the posttreatment performances of ESOP and non-ESOP firms without matching the firms on pretreatment performance.

Unfortunately, firms were not designated to establish ESOPs at random. Without random assignment, ESOP and non-ESOP firms are likely to perform at different levels even in the absence of any effect of the ESOPs. Those differences between ESOP and non-ESOP firms that exist even in the absence of ESOP effects are called "initial differences." If they are not taken into account, initial differences could either mask ESOP effects or masquerade as ESOP effects when comparisons are made on posttreatment measures. By matching ESOP and non-ESOP firms on pretreatment

performance, ANCOVA attempts to take account of initial differences when estimating the effect of the ESOPs.

Taking Account of Measurement Error

In practice, pretreatment performance can never be measured without some imprecision or error. To the extent that pretreatment performance is measured fallibly, the matching that is performed by ANCOVA will be imperfect. To the extent that matching is imperfect, initial differences between ESOP and non-ESOP firms will not be taken into account completely and the ANCOVA analysis will produce biased estimates of the effects of the ESOPs.

To minimize this difficulty, an adjustment was made in the ANCOVA model (Judd and Kenny, 1981; Cook and Campbell, 1979). The adjustment altered the pretreatment measure so as to take account of its unreliability. Following experts in the field of program evaluation, the value of the pretreatment-posttreatment correlation was used as a measure of reliability in making this correction in the ANCOVA procedure (Campbell and Baruch, 1975; Reichardt, 1979). This measure of reliability allows the removal of variability due to measurement error from our estimates of the ESOP effect.

Taking Account of Random Variability

Even after matching on pretreatment performance and taking account of differences caused by the ESOPs, the posttreatment performances of ESOP and non-ESOP firms will vary. ANCOVA assumes that this variation is random. If this is true, the variation does not bias the estimate of the effect of the ESOPs but it does introduce noise into the estimates. Because the effects of this random noise cannot be estimated exactly, the effect of the ESOPs cannot be estimated exactly. The best that can be done is to estimate the likely effect of the random noise within a range. Such a range is called a confidence interval. (We presented confidence intervals in chapter 2 with our estimates of the ESOP effect.)

A 95 percent confidence interval means that if we repeatedly drew samples from the population represented by our ESOP and non-ESOP samples, we would expect that 95 percent of our estimates would have confidence intervals that include the true ESOP effect. Thus, if a 95 percent confidence interval contains only positive values, one can reasonably infer that the true effect is positive (assuming the ANCOVA procedure is noisy but unbiased). For example, one of our estimates of the ESOP effect was 2.7 percent with a confidence interval of plus and minus 2.6 percent; this estimate has a range of only positive values of 0.1 percent to

5.3 percent (see table 2.1). However, if a 95 percent confidence interval contains both positive and negative values, there is reasonable uncertainty about the direction of the effect, and there is also reasonable uncertainty about whether or not an effect exists at all. This is the situation for most of our estimates of the ESOP effect.

Chapter 2 also presents the results of statistical significance tests. Statistical significance tests can be interpreted in terms of 95 percent confidence intervals. If the results of a test are statistically significant at the 0.05 level, it means that the 95 percent confidence interval does not contain the value of zero and so reveals the likely direction of the size of the ESOP effects. If the test is not statistically significant at the 0.05 level, it means the 95 percent confidence interval contains both positive and negative values and therefore that we should be uncertain both about the direction of the effect and about whether the effect exists at all.

Multivariate Analysis of Variance

Multivariate analysis of variance (MANOVA) estimates the pattern of performance in the ESOP firms before the ESOP was introduced. MANOVA then projects this pattern of performance forward in time and compares the projected with the actual pattern of performance after the ESOPs were introduced. The size of the difference between the projected and actual pattern of posttreatment performance for the ESOP firms is called the size of the discrepancy in the ESOP firms. The size of this discrepancy is attributed jointly to the effect of ESOP and to influences (such as changes in the business cycle) that occurred at the same times as the ESOPs were introduced.

MANOVA also does the same projection and comparison for the patterns of performance in the non-ESOP firms. That is, MANOVA estimates the pattern of performance in non-ESOP firms before the ESOPs were introduced. Then MANOVA projects this pattern of performance forward in time and compares the projected with the actual pattern of performance after the ESOPs were introduced. The size of the difference between the projected and actual patterns of posttreatment performance for the non-ESOP firms is called the size of the discrepancy in the non-ESOP firms. The size of this discrepancy is attributed solely to the effect of influences that occurred at the same times as the ESOPs were introduced.

MANOVA then calculates the difference between the discrepancy for the ESOP firms and the discrepancy for the non-ESOP firms. It is this difference between the discrepancies that MANOVA uses as the estimate of the

size of the effect of the ESOPs (Morrison, 1976; Algina and Swaminathan, 1979).

Projecting Forward in Time

To take projections forward in time, MANOVA estimates the pretreatment pattern of performance in ESOP and non-ESOP firms separately. In chapter 2, the pretreatment patterns of performance were estimated to be linear functions of time. These linear functions were estimated using data from two years before the ESOPs were instituted as well as the data from the single year during which the ESOPs were instituted. Given that pretreatment data were available from only these three years, a linear function is the most plausible pattern to fit to the data.

The Shape of the ESOP Effect Over Time

To estimate the size of the effect of the ESOPs using MANOVA as described above, the shape of the ESOP effect over time must be specified. Because only three years of posttreatment data were available, only three very simple yet plausible shapes were used. The first shape specified that the effect of the ESOPs increased linearly over time beginning with the year immediately following the introduction of the ESOPs. This shape would graphically appear as a change in the slope of the profitability or productivity measures (see figures 2.2 through 2.4). The second shape specified that the effect of the ESOPs was constant over time and began during the year immediately following the introduction of the ESOPs. The third shape specified that the effect of the ESOPs was constant over time and began during the second year immediately following the introduction of the ESOPs. The second and third shapes would appear as a jump in level for the profitability or productivity measures.

These three shapes were fit to the data simultaneously. This means that the effects of the ESOPs were allowed to take any combination of these three shapes. In this way, the MANOVA analysis was able to capture any pattern of effects that was possible to detect with three years of posttreatment data.

Taking Account of Random Variability

The performances of ESOP and non-ESOP firms vary among themselves. MANOVA assumes that this variation is random once both the pretreatment pattern of change and the effects due to the ESOPs have been taken into account. MANOVA also assumes that this random variation introduces random noise into the estimates of the effects of the ESOPs. Because the effects of the random noise cannot be estimated perfectly, the size of the effect of the ESOPs cannot be estimated perfectly. The best that can be

done is to estimate the likely effect of the random noise within a range of values and thereby estimate the size of the effect of the ESOPs within a range.

In reporting the results of the MANOVA, chapter 2 uses statistical significance tests to reveal the degree of uncertainty that is due to random noise. If the results of a test are statistically significant and if the analysis is unbiased, it means that one can be 95 percent confident that the result is not due to chance alone. If the test is not statistically significant, it means one cannot be confident about the direction of the effect nor about whether an effect exists at all. None of our MANOVA analyses resulted in statistically significant findings.

Potential Limitations of the Analyses

The results of both the ANCOVA and the MANOVA analyses may be biased. Though ANCOVA attempts to take account of initial differences by matching on a measure of pretreatment performance, there is no guarantee that this adjustment perfectly removes the effects of initial differences. Perhaps ESOP and non-ESOP firms would have to be matched on other measures in addition to measures of pretreatment performance if initial differences are to be removed. To the extent that initial differences remain after matching on pretreatment performance alone, the results of the ANCOVA will be biased.

Similarly, the results of the MANOVA analysis can be biased if the pattern of pretreatment performance is not linear as assumed in the analysis or if the non-ESOP firms are influenced by different extraneous forces (such as different effects of the business cycles) than the ESOP firms. Finally, the inability of the analyses to discover a reliable effect of ESOPs could be due in large part to the obscuring effects of random noise.

In spite of these potential limitations, the ANCOVA and MANOVA analyses that were reported in chapter 2 are the most appropriate analysis procedures that are possible given the available data. In addition, the agreement of the results from these two sets of analyses increases our confidence that our conclusions are correct.

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Glossary

ANCOVA	Analysis of covariance, a statistical procedure to assess the effect of a variable on an outcome after accounting for the effects of one or more other variables. In the present study, the effect of sponsoring an ESOP on corporate performance was assessed after accounting for the effect of performance prior to sponsoring an ESOP.
Employee Stock Ownership Plan (ESOP)	An employee plan and trust established to receive stock of an employer and other assets for allocation to the individual accounts of participating employees.
ERISA	The Employee Retirement Income Security Act of 1974, which first provided a definition of ESOPs and recognized the ability of such plans to use leveraging to purchase employer securities.
ERISA-Type ESOP	An ESOP other than a tax credit ESOP that may be permitted to borrow funds to purchase employer securities from the corporate treasury or stockholders. This type of ESOP includes leverageable, leveraged, and nonleveraged ESOPs.
Leverageable ESOP	An ESOP that is permitted to leverage under the terms of the plan documents but has not done so by a given date.
Leveraged ESOP	An ESOP in which money is borrowed by the ESOP trust for the purpose of buying stock of the employer. The stock may be held as security by the lender and released for allocation to participant accounts as the loan is paid off.
MANOVA	Multivariate analysis of variance, a statistical procedure which tests for reliable differences between groups on two or more variables. In the present study, for example, MANOVA was used to test for reliable differences in repeated measures of performance before and after an ESOP was sponsored as well as between matched ESOP and nonESOP firms.
Nonleveraged ESOP	An ESOP other than a tax credit ESOP that is not permitted to leverage under the terms of the plan documents. Although these plans do not take advantage of the special tax credit or leveraging provisions of the

	tax code, employers may establish them to take advantage of a number of other tax incentives for contributions under section 415 of the code. Also, some employers may be unaware that they may establish and maintain a stock bonus plan that is not an ESOP.
PAYSOP	An ESOP eligible for tax credits based on employee payroll; replaced TRASOPs in 1983. This credit expired at the end of 1986.
Tax Credit ESOP	An ESOP originating in the Tax Reduction Act of 1975, which allows employers to claim a tax credit for contributions to an ESOP. From 1975 through 1982, the credit was based on an employer's eligible investment credit; a 1 percent credit could be claimed for contributions up to that amount, and an additional 0.5 percent could be claimed for contributions that matched employees' contributions up to that amount. From 1983 through 1986, a credit of 0.5 percent of employee payroll was allowed. This type of ESOP includes PAYSOPs and TRASOPs.
TRASOP	An ESOP eligible for tax credits based on the investment tax credit provisions of the Tax Reduction Act of 1975, the Tax Reform Act of 1976, and the Revenue Act of 1978.

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